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December, 1944

EDISON ELECTRIC INSTITUTE BULLETIN

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PUBLISHED MONTHLY BY EDISON ELECTRIC INSTITUTE

THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

September, 1943 and 1944

SOURCE AND DISPOSAL OF ENERGY—MONTH OF SEPTEMBER

	1944	1943	%
GENERATION* (Net)			
By Fuel Burning Plants	13,303,518,000	13,477,207,000	− 1.3
By Water Power Plants	5,405,936,000	5,359,250,000	+ 0.9
Total Generation	**18,709,454,000**	**18,836,457,000**	**− 0.7**
Add—Net Imports over International Boundaries	139,252,000	111,970,000	+24.4
Less—Company Use	128,116,000	129,140,000	− 0.8
Less—Energy Used by Producer	387,452,000	855,300,000	−54.7
Net Energy for Distribution	**18,333,138,000**	**17,963,987,000**	**+ 2.1**
Losses and Unaccounted for	2,094,727,000	1,856,005,000	+12.9
Sales to Ultimate Customers	**16,238,411,000**	**16,107,982,000**	**+ 0.8**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of September 30th			
Residential or Domestic	27,302,699	26,885,477	+ 1.6
Rural (Distinct Rural Rates)	1,133,558	1,089,061	.....
Commercial or Industrial:			
Small Light and Power	4,238,516	4,163,623	+ 1.8
Large Light and Power	152,767	148,419	
Other Customers	116,360	118,629	.....
Total Ultimate Customers	**32,943,900**	**32,405,209**	**+ 1.7**
KILOWATTHOUR SALES—During Month of September			
Residential or Domestic	2,483,169,000	2,326,579,000	+ 6.7
Rural (Distinct Rural Rates)	358,108,000	328,220,000	+ 9.1
Commercial or Industrial:			
Small Light and Power	2,526,179,000	2,421,893,000	+ 4.3
Large Light and Power	9,345,265,000	9,405,968,000	− 0.6
Street and Highway Lighting	173,951,000	168,400,000	+ 3.3
Other Public Authorities	727,274,000	825,781,000	−11.9
Railways and Railroads:			
Street and Interurban Railways	345,285,000	346,479,000	− 0.3
Electrified Steam Railroads	206,676,000	206,068,000	+ 0.3
Interdepartmental	72,504,000	78,594,000	− 7.7
Total to Ultimate Customers	**16,238,411,000**	**16,107,982,000**	**+ 0.8**
Revenue from Ultimate Customers	**$270,233,200**	**$260,103,200**	**+ 3.9**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended September 30th			
Kilowatthours per Customer	1,130	1,058	+ 6.8
Average Annual Bill	$40.00	$38.30	+ 4.4
Revenue per Kilowatthour	3.54¢	3.62¢	− 2.2

(*) By courtesy of the Federal Power Commission.

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EDISON ELECTRIC INSTITUTE BULLETIN

Volume 12 DECEMBER, 1944 No. 12

E.E.I. Commercial Committees Reorganize for Large Postwar Sales Promotion Job

By G. W. Ousler

Chairman, EEI Commercial Division General Committee

THE Electric Utility Industry realizes fully that the war in Europe is not over. Severe fighting must be expected before Germany surrenders and the primary objective of this Industry is still the winning of the war. However, victory in Europe is hoped for within the near future and prospects are becoming brighter for the renewed production of electrical equipment, including appliances and lighting. The time is, therefore, appropriate to organize the Commercial Division General Committee in such a manner that it will function most effectively and be in a position to gear itself into the large sales promotion job which lies ahead.

After giving this matter of organization considerable thought, it seemed best to set it up on a market-development basis rather than on an appliance-application basis which has been true in the past. The principal advantage of this type of organization is that all the activities of a particular market are coordinated under the direction of one individual. As is shown on Chart I, the Commercial Division General Committee is divided into four major Sections: Residential, Commercial, Industrial, Rural. Each one of these Sections will be directed by a Vice-Chairman of the Commercial Division General Committee in charge of that particular Section. Under each of these Sections, as will be explained later, are several Committees, each in charge of a Chairman, who reports to the Vice-Chairman of the Commercial Division in charge of that particular Section. As was mentioned above, this type of organization combines all of the activities of a particular market under the direction of one individual. For example: the Vice-Chairman of the Commercial Division General Committee in charge of the Residential Section will direct all committee activities pertinent to the development of the Residential Market, such as, residential lighting, electric kitchens, electric laundry, home service, indoor climate, sales personnel, dealer coordination and water heating. This same procedure will be true in the Commercial, Industrial and Rural Sections.

Chart I also shows three Special Committees which have been set up independent of the four major Sections, but which cross the interests of all of them. Each one of these Committees will be in charge of a Chairman. The purpose of these Special Committees is to aid in the operation of the Sections. As the chart indicates, there is a Commercial Planning Committee, a Basic Sales Training Committee, and a Wiring Committee.

The Commercial Planning Committee has been functioning for the past two or three years and is primarily interested in preparation for postwar activities. A series of reports are being prepared, one of which has been sent out, and others will be mailed shortly, to all member Companies. These reports should be very helpful in aiding Utility Companies in their postwar planning. This Committee, organized to do a specific job, is expected to complete its assignment in the next few months and then will be terminated.

The Basic Sales Training Committee is one that is needed to develop adequate overall training programs for the Sales Organizations. Its purpose will be to develop training procedures that are basic and common to all selling activities. The personnel will consist of a Chairman plus as many members as seems desirable. The Chairman of the Sales Personnel Committee in each of the respective Market Sections will be a member ex-officio of this Committee, in order that the Committee can have full knowledge of that which is needed as training material for each of the Market Sections involved.

Due to the importance of Wiring, and also to the fact that it is a fundamental consideration for all market building, a Wiring Committee has been set up to cover this very important activity.

The Commercial Division General Committee has authorized the appointment of an Executive Committee among its members to include the General Chairman, the Vice-Chairman of each of the Market Sections plus six members at large. The Executive Committee will act on commercial policy matters, consider all industry programs and function on overall activities in the interim between meetings of the General Committee. This should make for efficiency and prompt decision.

Plans are also being made to enlarge the Commercial Staff at EEI Headquarters so that sufficient competent personnel will be available to aid in effectively operating the Commercial Division.

Several organization meetings have been held during the past few months and this whole revised organizational plan has been approved by the Commercial Division General Committee.

The Commercial Division General Committee consists of the following:

Organization Chart

COMMERCIAL DIVISION GENERAL COMMITTEE

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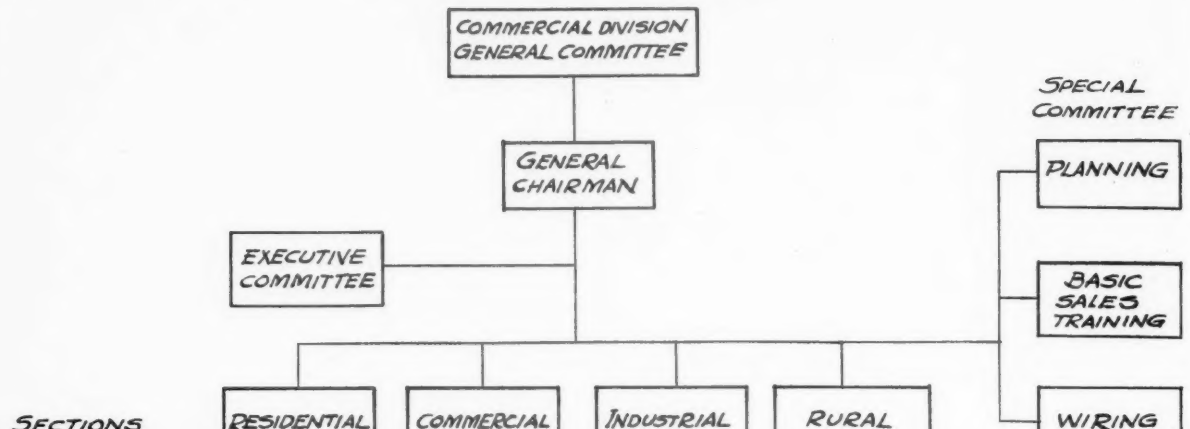

Chart 1

Chairman—G. W. Ousler, Duquesne Light Co., Pittsburgh, Pa.

P. M. Alden, Philadelphia Electric Co., Philadelphia, Pa.

F. A. Coffin, Wisconsin Electric Power Co., Milwaukee 1, Wis.

C. A. Collier, Georgia Power Co., Atlanta, Ga.

A. C. Crandall, Indianapolis Power & Light Co., Indianapolis, Ind.

D. M. DeBard, Stone & Webster Service Corp., 90 Broad St., New York, N. Y.

F. S. Dewey, The Cincinnati Gas & Electric Co., Cincinnati 1, Ohio.

H. E. Dexter, Central Hudson Gas & Elec. Corp., Poughkeepsie, N. Y.

R. E. Fisher, Pacific Gas & Electric Co., San Francisco, Calif.

R. A. Gibson, The Hartford Electric Light Co., Hartford, Conn.

R. F. Hartenstein, Ohio Edison Co., Akron, Ohio.

E. L. Kavanaugh, The Detroit Edison Co., Detroit, Mich.

E. F. Kelly, Central Illinois Public Service Co., Springfield, Ill.

C. D. Lawrence, New England Power Service Co., 441 Stuart St., Boston, Mass.

C. H. Leatham, Monongahela West Penn Public Service Co., Fairmont, W. Va.

A. V. S. Lindsley, The Connecticut Light & Power Co., Waterbury 91, Conn.

A. D. McLay, The Detroit Edison Co., Detroit, Mich.

C. E. Michel, Union Electric Co. of Missouri, 315 No. 12th Blvd., St. Louis, Mo.

J. E. North, The Cleveland Electric Illuminating Co., Cleveland, Ohio.

W. E. Parrott, Ebasco Services Inc., 2 Rector St., New York, N. Y.

J. F. Porter, Jr., Kansas City Power & Light Co., Kansas City, Mo.

P. H. Powers, West Penn Power Co., Pittsburgh, Pa.

Harry Restofski, West Penn Power Co., Pittsburgh, Pa.

M. R. Rodger, Middle West Utilities Co., Chicago, Ill.

H. M. Sawyer, American Gas & Electric Service Corp., 30 Church St., New York, N. Y.

M. E. Skinner, Buffalo Niagara & Eastern Power Corp., Buffalo, N. Y.

H. P. J. Steinmetz, Public Service Electric & Gas Co., Newark, N. J.

R. H. Tillman, Consolidated Gas Electric Light & Power Co., Baltimore, Md.

Edwin Vennard, Middle West Service Co., 20 North Wacker Drive, Chicago, Ill.

G. E. Whitwell, Philadelphia Electric Co., Philadelphia, Pa.

H. E. Young, Northern States Power Co., Minneapolis, Minn.

The Executive Committee, as approved by the Commercial Division General Committee, consists of the following:

G. W. Ousler, Duquesne Light Company, Pittsburgh, Pa.

Harry Restofski, West Penn Power Co., Pittsburgh, Pa.

P. M. Alden, Philadelphia Electric Co., Philadelphia, Pa.

E. L. Kavanaugh, The Detroit Edison Co., Detroit, Mich.

C. H. Leatham, Monongahela West Penn Public Service Co., Fairmont, W. Va.

G. E. Whitwell, Philadelphia Electric Co., Philadelphia, Pa.

H. P. J. Steinmetz, Public Service Electric & Gas Co., Newark, N. J.

M. E. Skinner, Buffalo Niagara & Eastern Power Corp., Buffalo, N. Y.

P. H. Powers, West Penn Power Co., Pittsburgh, Pa.

H. M. Sawyer, American Gas & Electric Service Corp., 30 Church St., New York.

Edwin Vennard, Middle West Service Co., 30 North Wacker Drive, Chicago, Ill.

The four Sectional Vice-Chairmen are:

Residential Section—Harry Restofski, West Penn Power Co., Pittsburgh, Pa.

Commercial Section—P. M. Alden, Philadelphia Electric Co., Philadelphia, Pa.

Industrial Section—E. L. Kavanaugh, The Detroit Edison Co., Detroit, Mich.

Rural Section—C. H. Leatham, Monongahela West Penn Public Service Co., Fairmont, W. Va.

The Chairmen of the Special Committees mentioned above are:

Commercial Planning Committee—M. E. Skinner, Buffalo Niagara & Eastern Power Corp., Buffalo, N. Y.

Basic Sales Training Committee—M. R. Rodger, Middle West Service Co., Chicago, Ill.

Wiring Committee—R. F. Hartenstein, Ohio Edison Co., Akron, Ohio.

The Chairmen of the various Working Committees under each of the Market Development Sections have, at the present time, not all been appointed and a list of these will be given at a later date.

RESIDENTIAL SECTION

The Residential Section, in charge of a Vice-Chairman Commercial Division, will have eight committees, each in charge of a Committee Chairman. The designations of these Committees are shown on Chart II.

It is important to emphasize again that the activities of each Committee are confined entirely to Residential promotional. In Committees such as Electric Kitchen and Electric Laundry, the activities will embrace the entire kitchen and entire laundry and not just one or two applications in either. The Lighting Committee will devote its entire thinking and planning to the Home Lighting market. The Water Heating Committee will give consideration to water heating problems, sales and technical. The Indoor Climate Committee will devote its planning and promotion to home applications related to indoor home climate, including house heating, air conditioning, ventilation, air cleaning, furnace fans, space heaters and all such users of electric service. This Committee should parallel for the utilities the promotional thinking of the Indoor Climate Institute.

The Home Service Committee will continue its activities along lines of past endeavor but will be a Committee of the Residential Section, where it fits most appropriately. A Dealer Coordination Committee has been set up to promote closer cooperation with electrical appliance dealers. This Committee will explore and make known to member companies the most effective means of working with dealers, of stimulating their sales activity, of assisting in training their personnel, obtaining reports of their sales, and the like. A Residential Sales Personnel Committee has been inaugurated to deal with problems of selection, training and compensation of residential sales personnel. Work in employee-training will be confined to specific job training, basic training being the province of another committee. The Chairman of this Committee, as has been indicated before, will be an ex-officio member of the Basic Sales Training Committee of the Commercial Division General Committee.

COMMERCIAL SECTION

The Commercial Section in charge of a Vice-Chairman Commercial Division will have five committees, each in charge of a Committee Chairman. The designations of these Committees are also shown on Chart II and the committee titles are expressive of their activities.

These Committees will confine their activities, plans and promotions to the Commercial customer classification, usually referred to statistically as small light and power. The Commercial Lighting Committee will prepare and make available to member companies helpful information on new lighting equipment developments, lighting applications to meet specific lighting problems, market opportunities for the sale of higher intensity lighting in the Commercial field, and sales methods which have proved

Organization Chart

COMMERCIAL DIVISION GENERAL COMMITTEE SECTIONS

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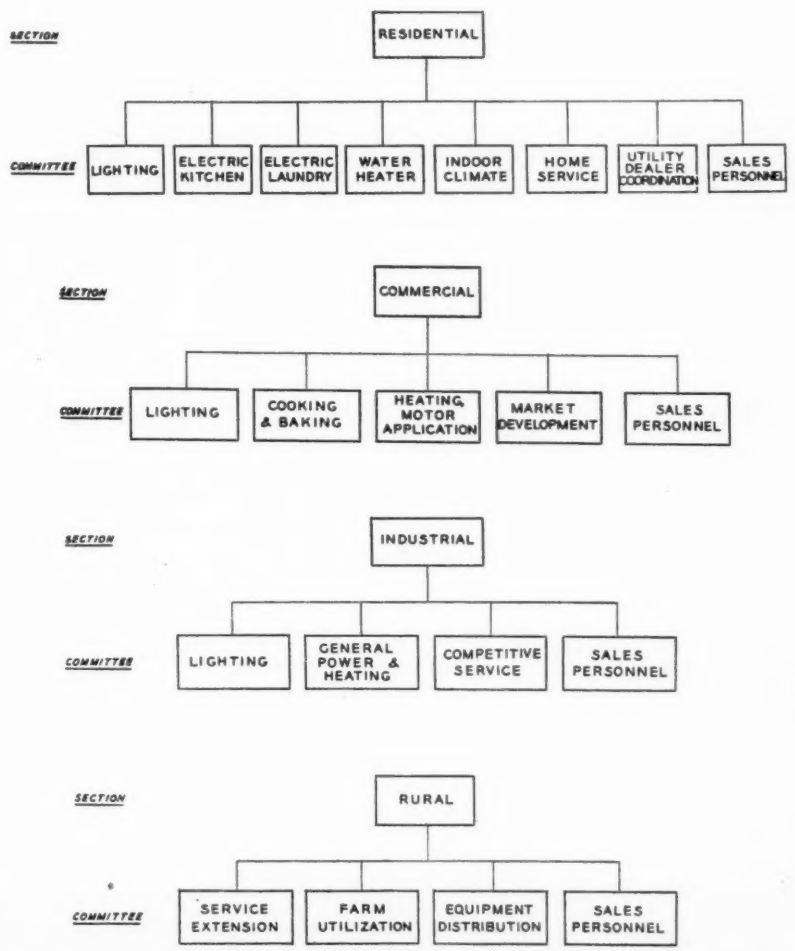


Chart II

successful in the Commercial lighting field. This Committee will cooperate with the Illuminating Engineering Society and the Better Light-Better Sight Bureau and other organizations which will be helpful to the Commercial lighting activity as a whole. The Heating and Motor Application Committee will have as its scope of activity—

1. Water heating, spot and strip heating, infra-red and electronic heating.
2. Air conditioning for comfort and profit.
3. Ventilation.
4. Refrigeration, which will include such phases of the subject as new developments in the distribution of frozen foods and locker plants.

Similar to the Residential Section, a Sales Personnel Committee will be set up in the Commercial Section for the selection of commercial sales personnel, the training of commercial salesmen, including a study of specific job training methods, methods of evaluating salesmen's performance in the Commercial field, etc. Again, as in the Residential Section, the Chairman of this Committee will serve as a member of the Basic Sales Training Committee of the Commercial Division General Committee. A Market Development Committee has been formed and will be concerned more with the Commercial market as such, and what electricity can do in it, than with the study of appliances and applications. It might also be designated as a "Committee on Market Analysis and Business Development." This Committee will work in close cooperation with other Committees in the Commercial Section. It is thought that this Committee can do a useful work in a field which has not been given the attention that some other phases of Commercial selling activity have received.

The Commercial Cooking and Baking Committee will be responsible for the preparation and dissemination to Member Companies of information relative to Commercial Electric Cooking. In addition, this Committee will consider the advisability of re-activating the Commercial Electric Cooking Council in cooperation with manufacturers when equipment again becomes available.

INDUSTRIAL SECTION

The Industrial Section in charge of a Vice Chairman Commercial Division General Committee will have four committees, note Chart II, each in charge of a Committee Chairman.

The objective of the Industrial Section, of course, is to provide tools and training methods for effective sales promotion and the meeting of competition in the industrial field. The General Power and Heating Committee will study and report on all industrial power uses, such as motor applications and controls, industrial refrigeration, air conditioning and ventilation, heat treating, melting, welding and high frequency heating. The Competitive Service Committee will study and report on present and future competition of all sources of power and heat for industry, and will keep the industry advised as to possible future trends and developments in the entire competitive market. The Sales Personnel Committee will plan and submit practical sales training programs for utility industrial men, it will prepare information and training methods to carry out the functions required for the industrial job. The Chairman of this Committeee will also be a member of the Basic Sales Training Committee of the Commercial Division General Committee. The Industrial Lighting Committee will study and report on the developments in the industrial lighting field and will suggest new ways to improve new lighting and its application to industry.

RURAL SECTION

The Rural Section in charge of a Vice Chairman Commercial Division General Committee will have four committees, each in charge of a Committee Chairman. The designations of these Committees also appear on Chart II.

The aims and objectives of the Rural Section are to promote the sale of Rural Electrification in all its various phases and in the broadest sense for the benefit of all concerned in this endeavor. The Committee on Extension of Lines will study and provide information to member companies relative to rural extensions. The Committee on Farm Utilization is one where the work will be similar to that already carried on by the present Farm Utilization Committee. This Committee will have close contact with the American Society of Agricultural Engineers and its activities will have mostly to do with utilization of equipment on the farm. The Equipment Distribution Committee has been inaugurated to concern itself with such matters as Dealer Relations, Mail Order House Selling Plans, Machinery Manufacturing Company Sales Plans, Utility Sales and Promotion Plans and cooperation with others attempting to do similar work, with NEMA, the Farm Machinery Institute, and others. The Sales Personnel Committee will concern itself only with such problems as are peculiar to the promotion and sale of Rural service. The purpose of the Committee will be to prepare such special training through the publication of a manual, or otherwise, for Rural men. The Chairman of this Committee, similar to the Chairmen of the Sales Personnel Committees of the other Sections, will be a member of the Basic Sales Training Committee, Commercial Division General Committee.

* * *

The foregoing plan of Organization is summarized briefly and indicates in a general manner the activities of the four main Sections and the Committees which are set up under these Sections, and also the duties and activities of the three Special Committees which will aid in the operation of the four major Sections. With such an organization, and with sufficient competent personnel at E.E.I. Headquarters, it is to be hoped that a most complete internal job can be done for the benefit of our membership and that adequate contacts can be maintained with associations similar to E.E.I. Since the organization is set up on a market-development basis, each Sectional Vice Chairman will be responsible for full coverage of the particular Market assigned to him. In this manner each branch of that Market should be given due consideration.

Plans are under way, if they can be consummated, to hold in different sections of the country throughout the year general independent conferences; one on Residential, one on Commercial, one on Industrial, and one on Rural, to which, it is hoped, that Member Companies will send personnel that are interested in the development of that particular market. For example—When a Residential General Conference is held, Member Companies will be invited to send their Residential men to such a Conference with the expectation that much benefit will result to them and their Companies from that which will be presented at such a Residential Conference. At the present time, it is not planned to eliminate the overall General Conference which has generally been held in Chicago during the Spring of the year.

Some Problems Facing Operating Executives and Engineers in the Postwar Era

By C. B. McManus
Assistant Operating Manager, Georgia Power Company

Presented before Engineering and Operation Section Meeting, Southeastern Electric Exchange, New Orleans, La., Sept. 21, 1944

I SHOULD like to point out at the very beginning that the title of this paper states "Some Problems," and that it does not indicate that the solution of any of these problems is attempted. None but a soothsayer would attempt to outline all of the problems that will have to be faced, and not even a crystal gazer would attempt to give you all the solutions. Nevertheless, there are some broad problems that we have today that are certain to become more pronounced in the postwar era, and it is the intent of this paper to point them out and to venture an opinion on a possible, or a partial solution.

In this paper I am going to discuss what I consider to be two major problems, and when you analyze them I am sure you will agree that they are broad and inclusive.

First—To conduct our business in such a manner that our customers and the public in general will want to continue to do business with us, rather than with someone else.

Second—That in accomplishing this objective we do not weaken the economic position of our companies.

The first problem, that of "conducting our business in such a manner that our customers and the public in general will want to continue to do business with us, rather than with someone else," is of course the problem of executive management as well as every employee, but I do not believe that our executives, nor we as operating men and engineers, realize the extent to which the policies we adopt, and the everyday decisions that we make, influence the solving of this problem. Too often it is looked upon as a problem for the Executive, Sales and Advertising departments to solve, when as a matter of fact the decisions made by operating men and engineers are often a fundamental factor.

1. If we are lavish in the expenditure of capital or operating and maintenance money, or if we keep our physical property investment higher than it should be, we will not be able to meet competition and we make a rate base so high that it is difficult to sell our service at a reasonable rate; and no company can have the full confidence of its customers if its rates are not reasonable.

2. If we are niggardly in the expenditure of capital or operating and maintenance moneys, or if we allow our physical properties to become run down and inadequate, our service is bound to deteriorate; and no company can have the good will of its customers if its service is not adequate and reliable.

3. In a company operating over a wide area, such as most of the companies in the southeast, the selection and location of operating and maintenance personnel is a vital factor in obtaining public good will.

4. The prompt and courteous handling of complaints and appliance repair work is very vital, as is the proper handling of tree trimming.

5. The handling of labor problems, and particularly so when labor unions are involved, can materially affect the attitude of a large group of people. You cannot expect good public relations if your employee relations are bad.

I could go ahead and mention a good many other cases where the decisions and performance of operating men and engineers vitally affect our customer and public good will, but I think these typical examples are sufficient. I don't mean to say that a company that renders good service at reasonable rates will automatically have the confidence of its customers, for such is not the case. The activities of our Sales Department and Advertising Department, as well as other departments, are just as necessary as adequate and reliable service at reasonable rates; but I do say that no company can have, and no company deserves, the good will of its customers unless they do receive adequate and reliable service at rates which are reasonable, for this is the solid foundation on which our entire industry is built.

To do our part in solving this problem, we must first understand that we are playing a very important role, and appreciate that each and every decision makes its solution either harder or easier. We must all be salesmen; we must take advantage of every opportunity to create public favor; we must see that the public has an opportunity to know what we are doing to extend and improve our service; we must be better citizens by taking a greater part in public activities; we must be on the lookout for opportunities to serve in any activity that is for the good of the community; we must see that the public understands that we are the kind of people who live on accomplishments, and that we are always ready to assist in any activity that contributes to the welfare or betterment of the community.

We operating men and the employees under our supervision, come into more intimate contact with more members of the public than any other department of the company, or than any other business serving the public. Does not this fact alone give us a greater opportunity than anyone else to demonstrate to our customers and the public in general that we are helpful, that we are reasonable, that we are an asset to the community, that we are rendering a useful, adequate and continuous service, at reasonable rates, and that when we do make mistakes we will correct them? Does it not give us the opportunity and the responsibility of convincing our customers, and the public in general, that we do a better all around job for them and the community than anyone else would do? But we should always keep one thing in mind, and that is, that there is no possibility of obtaining full customer and public confidence unless we first deserve this confidence. We as operators and engineers should definitely understand that good service and reasonable rates are cer-

tainly necessary to obtain customer and public confidence, but that these two accomplishments alone will not obtain it or hold it. *We can stay in business only so long as our customers and the general public had rather do business with us than with anyone else.*

The second problem, that *in* accomplishing the objectives we have just discussed we do not weaken the economic and financial position of our companies, is one that must be solved simultaneously with the first, or else the first problem cannot remain solved. Solving this economic problem is to a very large extent —more so, I believe, than is generally realized by our own managements—the responsibility of operating and engineering men. I say this because we are the ones upon whom management must depend to:

First—Keep our physical property investment to a minimum.

Second—Keep our operating and maintenance expense low.

And while we are doing these things, we must at the same time continue to improve the quality of our service, be able to adequately and promptly meet the additional needs of our existing customers, and make it possible to economically extend our service to adjacent unserved areas and to new customers.

It is my belief that the management of our various companies have the utmost faith in their operating and engineering personnel to do these very things. We have, at least to some degree, done them in the past, and I think they believe we can continue to do them. *I agree,* provided that both we operators and engineers as well as management, fully realize the difficulties and recognize the influences and trends that are tending to make this job more and more difficult. I do not know what the limit is in rate reductions, labor wage increases, or more and varied kinds of free service to our customers, but I do know that unless these things more than compensate for their cost they reduce the money available for the thing that we as operators and engineers are expected to accomplish. It is what is left at the bottom of the balance sheet that determines how long we can remain in business and render good service.

Just what can we as operators and engineers do to assist in keeping our companies in a strong financial position? First, we should be quick to give our management the benefit of our opinion when in our judgment a present or proposed policy is unwise or questionable. But in doing this let's be sure that we have thought it through, and that our opinion is based on the good of the company as a whole, and not on the interests of just one department.

Some of the other items I am going to mention may sound to you to be rather elementary, and so they are; but you may find in these elementary suggestions some real opportunities for improvements.

Let's discuss ways and means of keeping our physical property investment to a minimum, keeping in mind that while doing this we must continue to improve our service, maintain an adequate margin of capacity for growth, and keep our operating and maintenance expenses reasonably low. The territory in which most of us operate, is such that we are not justified in setting a single standard of service reliability or voltage regulation for all customers. Service interruptions to small groups of customers, even though they may happen more frequently, are not usually as serious as an interruption to an entire city or town. The conditions under which interruptions to service occur are important, as, for example, the public will usually be sympathetic to service interruptions caused by a local tornado, while they may be very critical of a service interruption which occurs during good weather. Taking full advantage of these conditions is largely a matter of using good judgment in both our engineering and operating; but this judgment should be based upon conclusions reached as a result of close study of good records and good engineering.

The proper maintenance of lines and equipment can contribute greatly to keeping our plant investment low. It may eliminate the need for early replacements, the need for additional generating equipment by increasing the availability of present units, and by eliminating the necessity of duplicate sources of power. If adequate service can be provided by one line properly maintained, both the investment and the maintenance will usually be less than with duplicate lines. It must be remembered that where two lines protecting the same service originate at different substations, additional substation and transmission line capacity will have to be provided.

Good operating policies and methods are a necessity, not only to reliable service, but it can be made to assist in keeping plant investment low. The prompt restoration of service after an interruption may be an important factor in eliminating the necessity for duplicate sources of power. Our policy of loading equipment and lines may have a very large influence on plant investment. Having attended these meetings from the very beginning of this Exchange, I know that you distribution engineers have given much thought to this subject, and I believe that we in the southeast were among the first to take advantage of the inherent short time thermal capacity of distribution transformers. In my own company it has been the policy to load distribution transformers serving residential areas to 150 per cent or more, for more than 16 years, and I believe the lessons we have learned by necessity during the war has taught us that a similar policy on other equipment is wise and justified. I have never been convinced that the loss of life of equipment due to high loading is as great as is generally believed, but even if it is, there are still sound reasons, in my opinion, for shortening the life within reason as long as such operation does not cause other expenditures out of proportion to the savings made, or results in unreliable service. It must be kept in mind that generally the loss of life that we talk about is not the loss of life of the entire piece of equipment, but only a portion of it. For example, a transformer consists of a tank, bushings, oil, copper, insulating material, and an iron core, and the overloading of it, if within reason, does not decrease the life of anything but the winding, and possibly the oil and the core if heating is excessive, and of course the copper in the winding has a scrap value, and the oil can usually be reclaimed. Then, in addition to that, the cost of rewinding and putting the transformer back into service is a maintenance expenditure which, under present tax laws, allows a very large saving, and under any foreseeable tax laws, a considerable saving.

Now please do not get the impression that I am recommending that we carry this policy to the extreme, but I am saying that these facts should not be overlooked in setting up policies for loading our equipment, and that these policies can materially affect our plant investment. It is of course obvious that auxiliary cooling of equipment is one of the most economical ways of getting increased capacity, but since I am talking about elementals, I am going to mention it and say that a study of peak durations

and of the results that can be obtained by the various cooling methods available may be well worth while.

Planning is another important tool that we can use as an aid in keeping our plant investment low. Planning is necessary to see that our margin of capacity for growth is adequate but not excessive, that adequate and reliable service will be available when it is needed, and that the many small jobs that are required, particularly on distribution systems, are engineered and constructed in such a manner that they fit into a master plan for the entire system.

The choosing of the most economical design, such as the voltage, type of system, and type of equipment, is fundamental to an economical system. We know, for example, that in general a secondary network is the most economical method of supplying heavy load densities. We also know that a radial overhead system is the most economical for serving low load densities. The load densities between the high and the low are the ones that offer real opportunities for savings, and are the ones that we are most likely to have a few years after the war is over. I think we are going to have a large increase in our residential and commercial loads, and the decisions we make in serving this increase in load may well set the pattern for system design for a good many years. If this is true, it behooves us to be very sure that our engineering is sound.

I believe the trend is to higher distribution voltages and much consideration should be given to this subject as our loads grow. Modern equipment gives us more latitude than in the past. We have high speed breakers, high speed reclosing, step regulators, unit type substations, capacitors, pole top reclosers, telemetering for tie-line load control, high speed excitation, and many other devices to assist us. It is the proper application of these and many other items that determine our real ability as operators and engineers.

Time does not permit the detailed discussion of many other items, but I would like to mention that as labor costs rise, the cost of "assembled on the job" construction increases out of proportion to the cost of articles manufactured by mass production methods, and that standardizing of equipment will bring the unit cost down. Good records, correct maps, economical construction methods and adequate and trained supervision are all worthwhile, and important tools to assist us in keeping our plant investment low.

The problem of keeping our operating and maintenance expenses low enough to permit reasonable earnings and still continue to adequately operate and maintain the properties is one that is going to call for much analyzing and the use of a great deal of ingenuity. Let's start off by assuming that labor rates will remain high, and that the cost of money will remain substantially what it is today. During the past 15 or 20 years there has been a substantial increase in labor rates and a marked decrease in the cost of money, and this fact cannot be overlooked in the design of our generating plants, substations and lines. In most cases it will be found that the additional investment required to provide for the operation of generating plants and substations with a minimum number of operators will be more than offset by the saving in operating labor. Designs should also be checked to see that equipment can be taken out of service for inspection and maintenance during regular operating hours, so that overtime rates will not have to be paid for this work.

The above refers to savings that may be made by proper design of new stations, but I believe that there is a larger immediate saving in eliminating operators at existing generating plants and substations. I realize that much of this work has already been done, but in our own company it has been amazing to find how much more of it can be done when you really analyze each plant or substation. In many cases the additional investment required can be saved in two or three years, and our experience indicates that modern automatic equipment, properly maintained, is more reliable than operators.

Consideration should be given to the greater use of mechanical hole diggers, ditch diggers, derricks, bulldozers, automatic splicers, and other mechanical devices that eliminate or reduce field labor.

A thorough analysis of operating methods may show where substantial savings can be made. For example: Are crew headquarters located properly with respect to the distribution of work? In larger cities would it be more economical to work crews out of several headquarters rather than one? In outlying territory are crews properly located? Are we loading up district and field engineers with paper and stores work when it would be more economical to employ a clerk to do this work? Have we examined all the reports that are being made to see that they are still necessary? Are we really analyzing our interruption records to see that service is improved and that we are not using manpower that could be economically eliminated by additional expenditure of capital or maintenance money, or by a change in operating methods? Are we spending unnecessary money for transformer and line fuse replacements which could be eliminated by a more careful study of our fuse coordination, or better maintenance? Have we sold our customers on the idea that appliance repair work is something they should pay for and that they should not expect us to do this work free of charge, or at a price below our cost? Have we sufficiently trained our appliance repairmen so that a second trip is unnecessary? Are we testing single phase meters in the shop instead of on the customer's premises? Are we replacing our street lamps in the most economical manner? Do we have an efficient repair shop with trained personnel and sufficient equipment to do economical work? Are communication facilities adequate? Are emergency patrols properly organized and followed? Do you have clear and concise emergency operating procedures for use when communications are interrupted?

All of these questions are easy to ask but are not so easy to answer; yet if we are to do a really efficient job we must find the answers to them, as well as to many more, and when the answers indicate that changes in policies, practices or methods are justified, we must have the courage and the stamina to follow through to obtain maximum results.

Development of Domestic Electric Service in the United States

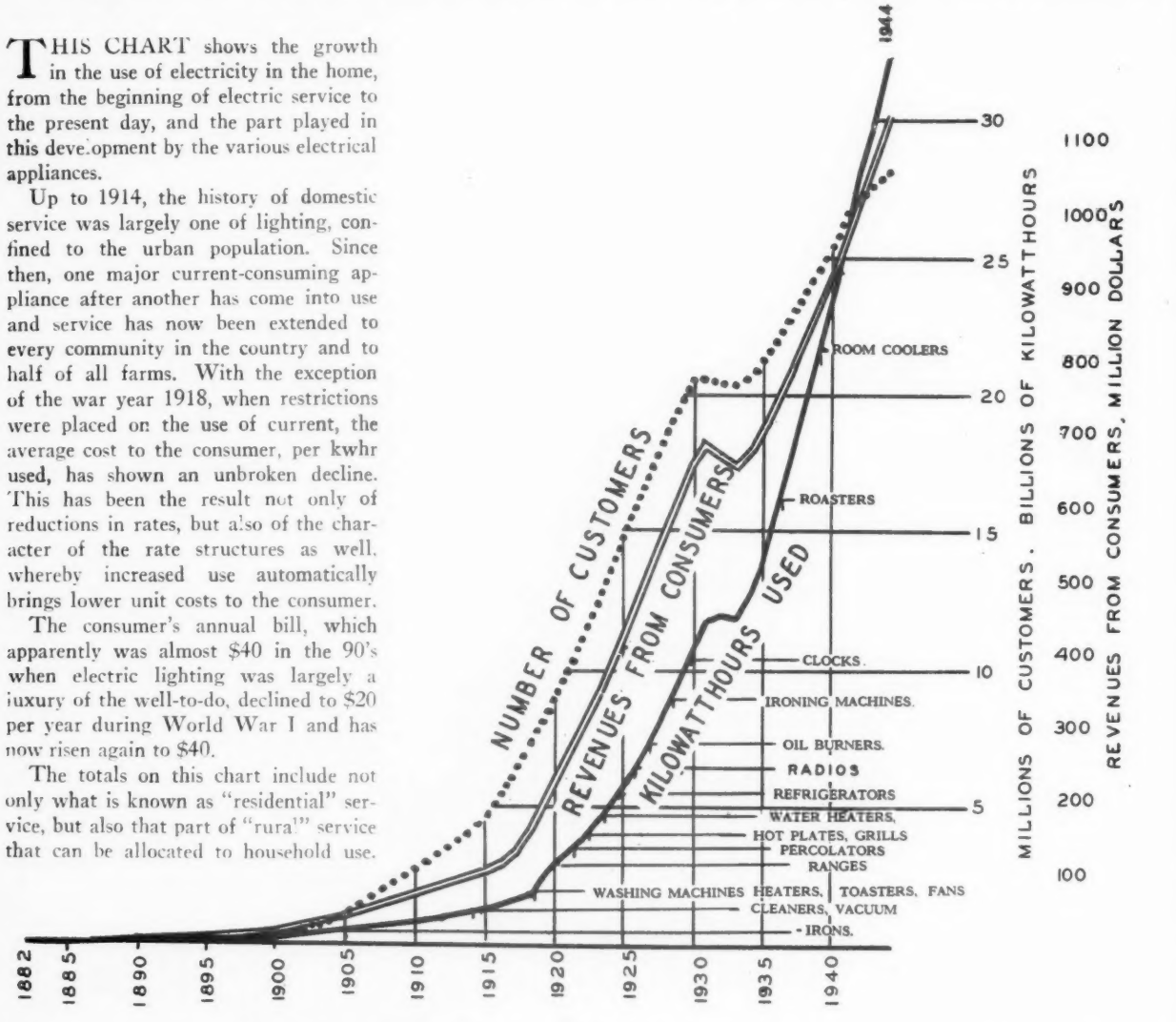
Showing the Dates When Each Major Electric Appliance Came Into General Use

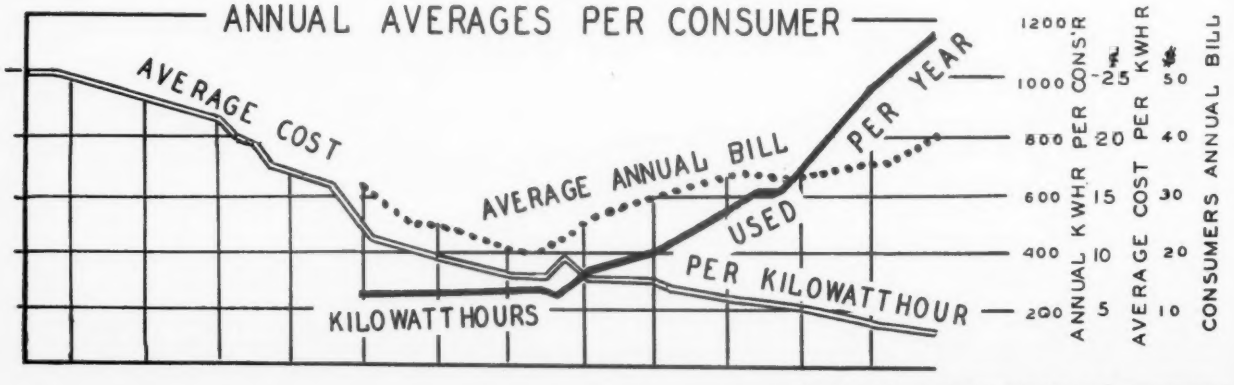
THIS CHART shows the growth in the use of electricity in the home, from the beginning of electric service to the present day, and the part played in this development by the various electrical appliances.

Up to 1914, the history of domestic service was largely one of lighting, confined to the urban population. Since then, one major current-consuming appliance after another has come into use and service has now been extended to every community in the country and to half of all farms. With the exception of the war year 1918, when restrictions were placed on the use of current, the average cost to the consumer, per kwhr used, has shown an unbroken decline. This has been the result not only of reductions in rates, but also of the character of the rate structures as well, whereby increased use automatically brings lower unit costs to the consumer.

The consumer's annual bill, which apparently was almost $40 in the 90's when electric lighting was largely a luxury of the well-to-do, declined to $20 per year during World War I and has now risen again to $40.

The totals on this chart include not only what is known as "residential" service, but also that part of "rural" service that can be allocated to household use.





EDISON ELECTRIC INSTITUTE

Jobs Over Kilowatts

By Frank McLaughlin

President, Puget Sound Power & Light Co.

Excerpts from an address before the Seattle, Wash., Chamber of Commerce

THERE is too much in the way of sky-writing, muddy thinking, and just plain applesauce as to electric power's part in the location of industries, and as regards its place in "Politics." I want to take power out of the fantastical and fanatical realm. I would like to do some "cracker barrel" thinking, free from the static of "crackpot tinkering." If power is really going to do the job it should in postwar development it must be looked upon as an extremely useful tool and not as our greatest asset. You have got many great assets which, taken together, make for a future bright with promise.

Electric power is only one of the factors to be considered in the location of industry. Electric power by itself cannot produce a well balanced industrial development with large payrolls, no matter what the price for power. Generally speaking, even if electricity were free, a sound, diversified development will not occur unless other conditions are right. These other requirements are: (1) market for the products; (2) raw materials with which to make the products; (3) an adequate supply of suitable labor; (4) transportation from the place of manufacture to the market where product is sold must be inexpensive and speedy; (5) reasonable tax laws and sound government; (6) living costs must be reasonable.

High-octane propagandists would have you believe that cheap power came to this areas with the Grand Coulee-Bonneville projects and that the retail distribution by government agencies of such power will make this territory a beehive of industrial activity after the war. As a matter of fact, this State has always had cheap power. No industry has failed to locate here because power rates were too high. It must be "power politics" that has kept industry away. If power was controlling in the location of most industry, we would be tops in population among the cities of the country.

The City of Tacoma has always extensively advertised its cheap electric rates as the lowest in the country, and if it were true that cheap power is the one big thing that makes for development and progress, then why isn't Tacoma at least the largest city on the Pacific Coast? In 1890 the populations of the cities of Seattle and Tacoma were about the same. From 1890 to 1940 the population of the city of Seattle increased 760 per cent, while Tacoma's gain was only 200 per cent. In the same period of time, the population of Los Angeles increased about 3000 per cent and electric rates in that city are no lower than they are here.

* * *

Power's Small Percentage of Total Manufacturing Cost

The fact that electric rates in the large industrial centers of the country are higher than they are here conclusively indicates that from the standpoint of the average industry, factors other than power determine its location. It may surprise you when I say that electricity amounts to only one per cent of the value of the product in the average industrial plant.

The U. S. Bureau of Census in 1939 published a census of manufacturers which showed the total value of manufactured products in that year was 61 billion dollars. These figures reveal that the cost of electricity in the average manufactured article is less than a dollar for every $100 worth of goods manufactured. If electricity cost nothing, the cost of $100 worth of average manufactured articles would be reduced only 82 cents. The cost of power is, naturally, not the same for all industries, just as other costs are not the same.

Certain classes of industries are dependent upon much greater use of electricity. To these industries, of course, power is important. Among the major ones are aluminum, magnesium, zinc and heavy chemicals. In aluminum, the cost of electric power per $100 of finished product is about $30, and with chlorine and caustic soda it is around $13.

Unfortunately, the industries for the most part which need large amounts of power do not provide many jobs. For instance, the six aluminum plants in the State of Washington have an electric power requirement of in excess of half a million kilowatts, but the total number of employees is only 4400. On the other hand, the Boeing Aircraft Company, at its main plant in Seattle, has a power requirement of only 10 per cent of that of the aluminum plants, and yet it employs over six times as many workers.

* * *

TVA Program

When I hear about the amazing claims as to what public power will do in the Northwest after the war, I am reminded of what David E. Lilienthal, now head of the Tennessee Valley Authority, had to say about TVA back in the early 30's, and I quote:

"It is my firm conviction that the Tennessee Valley region is to be the scene of an expansion of industry which in the course of the coming decade will change the economic life of the South. If this industrial development is controlled in the interest of the entire community and fitted into a national program, it will stimulate and regenerate the industrial life of all America."

He takes in quite a lot of territory, I'll say, but a few highlights from the record would indicate that Mr. Lilienthal's prewar dreams might be classified as of the pipe variety. An editorial in the Florence, Alabama, Herald in July, 1937, said, in part:

"According to a statement recently made by a leading citizen of Florence, who has no connection whatever with any power company—but who has made a thorough study of the industrial situation in the state—during 1936 no less than 26 new industries of importance located in Alabama. Not one of these came into Alabama territory served by the TVA, and not one has come into this area during the four years the TVA has been in existence."

An article in the Chicago Daily News in June, 1937, said:

"The disappointment of the Tennessee Valley over the industrial growth of the region since TVA's magic cheap power became available, which is evident in the authority's appeal for more favorable freight rates, is just one more instance of the misunderstood role of power in industrial growth. In its quest for cheaper rail rates TVA acknowledges that it needs accessibility to markets as well as dams and generators."

The Blue Book of Southern Progress shows that for the years 1938 and 1939 over ten times more was spent for industrial expansion in Virginia, which has

no TVA, than in Tennessee, the home of TVA.

Athens, Alabama, near Muscle Shoals, complained editorially in May, 1939, that the promised industrial boom had not materialized, and that after six years of cheap electricity in the Valley, the PWA was still its greatest single industry.

The TVA's prewar record shows that industry did not respond to the call of planned economy.

When Senator Harry Byrd was governor of Virginia, he sponsored a program of attracting capital to Virginia, not through subsidies or bonuses, so to speak, but on the basis that industry would make money by putting plants in Virginia. He had all the burdensome laws revamped and had Virginia's industrial assets wrapped up in an attractive package and presented to those who would benefit by having plants in Virginia. The results obtained were astounding. In just a period of a few years, in the neighborhood of 250 million dollars of industrial investment was made in Virginia.

* * *

Performance of All Business

American industry has made an amazing contribution to the war effort. Eighty-five per cent of the power for industry has come from the private utilities. This conclusively proves that you don't have to have socialized electric power in order to make astounding production records in America. It does prove that the Individual Enterprise system is the world's greatest benefactor in this hour of peril.

* * *

Power in Politics

Electricity is hot stuff. It requires care in handling—both as to its physical aspects and in its broader use as a servant of man. It is not a proper plaything for crackpots or demagogues. Unfortunately, out here Electric Power has for many years past been used as a stepping stone to greater political power, and even today, in the midst of war when grave problems of great magnitude confront us and the blood of our country's best is being spilled on the battlefields, the power politicians are making it a major political issue. If they want a real constructive issue, why don't they pick out taxes? If the average family's tax bill of today were reduced 10 per cent, the saving would be more than double the average domestic customer's electric bill. The taxpayer can be helped by putting public power property on the tax roll, not by taking private power property off the tax roll.

It seems the more electric power we get the more politics we get, and the lower electric rates become, the cheaper the politics. All the ballyhoo along the lines that socialized electric power is the thing that is going to solve our after-the-war problems and make this area a swarming beehive of industry is just a cover-up for more Bureaucracy and more Regimentation and more political domination of business.

* * *

People Disturbed—Regimentation

I believe that every American is disturbed today because of the extent to which centralized government is regimenting the individual and controlling and dominating the economic and political life of the country. Today business generally and people collectively are up against, broadly speaking, the same thing which the power companies have had to contend with out here for so long.

* * *

The great bulk of the nation's industry is in private hands. People as a whole in the United States have not in any sense thrown the freedom of enterprise system overboard, nor is there any real indication that they are going to do so—all the signs point the other way. I think it would be a terrible mistake to make ourselves a shining target by any repudiation of free enterprise in the State of Washington.

* * *

Just as socialization of business is not a good thing, socialization of power is not a good thing. I have always observed that when a house is on fire, everybody wants to help put it out, not only because of the good neighbor policy, but so that their own homes next door or across the street will not be menaced or destroyed by the flames. The same should be true as to socialism in business for the same reasons. Further socialization of power today means socialization of something else tomorrow, because such a program menaces the people's political and economic freedom and the freedom of standing on their own feet and running their own businesses. We have seen in Europe what happens when these trends are followed to their inevitable conclusion—the government becomes all-powerful, and the citizens merely slaves of the state.

Postwar Development

Now all of us, through postwar planning, want to attract industry and to develop our resources. As we see it, the financial and industrial leaders of the country must first be convinced that the State of Washington presents a real opportunity for fruitful enterprise. After this has been done, our plan contemplates personal solicitation of the particular kinds of business which it has been shown by careful study and research can do well here. We have set the stage by preliminary individual contacts and by sending to large insurance companies, investment bankers and industrial leaders copies of our national advertisements. In this connection I want to make it clear that it is not a part of our plan to bring in new industry which would result in a "funeral" for any existing industry. We are for home rule.

* * *

Human Power—Not Electric Power

Now, getting down to what really counts, I want to say that the destiny of this city and of this state rests with Human Power and not Electric Power—with Human Dynamos and not Electric ones. Men must ever be greater than the machines they create. If we are to achieve our employment and high standard of living after-the-war objectives, we must recognize that the possibilities of the individual are much greater than the possibilities of machines. It's jobs over kilowatts—Manpower over Horse Power. In the world of tomorrow, human relations—human values—must play a greater part than ever before. Reduced to the concrete, and with a "grass roots" approach, this means to me that:

First—That America must be kept as a land of opportunity in every respect for the individual. Furthermore, the individual must be regarded, not as a cog in a machine, not as one to be regimented, but as a human being with hopes, aspirations and a desire to better himself, and he must be assured of the opportunity as he contributes to the welfare of society to obtain a more generous measure of the good things of life. He must be allowed to travel as far as his talents will take him, a la Edison, Westinghouse, Bell, Ford and the like. To make this democracy of ours work, the individual must have, after the war, the freedom he is now fighting for.

Second—There must be effective cooperation between all the producing groups. None should be allowed to benefit at the expense of unfair restrictions

and regimentations imposed upon the others. No group should advocate the socialization of other groups while opposing socialization of its own group. Those who believe socialism is a good thing should try it on their own piano first. It must be recognized that in our modern society, real prosperity only comes from harmonizing the interests of all producing groups.

Third—In these critical times especially, we must have able men in government. An absolute must is that only men should be elected to public office who will provide good government.

Men who believe in the principle of the people running the government and not the government running the people —who believe that the individual and business and agriculture should be given the greatest amount of economic freedom and opportunity for service and progress.

Men who will stand committed to an equitable tax policy that will result in maximum employment of men and money in free enterprise.

Men who believe that the laborer is worthy of his hire—and that Capital is entitled to a fair return—and that you can't build empires with doles and boondoggling—and that you cannot substitute government paternalism and Uncle Sam's pocketbook for the rugged individualism and the sterling qualities of the pioneer.

Men who believe that restrictions and regimentations necessary under wartime conditions must be removed as soon as practical, consistent with the maintaining of a sound economy.

Men who believe that government should do only what individual initiative cannot do—and that during the transition period from a war to a peacetime economy, government should help private enterprise, rather than promote socialistic activity.

Fourth—We must have the finest character and the highest quality of leadership attainable — not only individually in our own affairs, but collectively in all those things that make for community progress and prosperity. After all, it's people who build cities, and it's fellows like you whom the people depend upon for able, enlightened and courageous leadership. So I say, give the people something to get their teeth into. They are fed up with the politicians' "all day suckers." They want you to steer the good ship Opportunity in the "World of Tomorrow." It's up to you to take the wheel and do the job. I don't care what the resources are as to materials or geographic location, or climate or what not. If a city does not have the right kind of leadership it will not break the tape a winner, and it will not hit the home runs—and it will not make the touchdowns. I have seen cities without much in the way of natural advantages, and whose leaders had little else but "brains and intestinal fortitude" to go on, achieve the seemingly impossible; and I've observed other cities that had been generously endowed by nature, but whose people were content to sit idly by, degenerate into deserted villages or "ghost" towns. A city is just what its citizens make it.

An Appraisal of Our Competition

SECTION II of the Postwar Planning Reports of the EEI Commercial Planning Committee has just been published by the Institute under the title, "An Appraisal of Our Competition." The first section of the series of reports, "Basic Planning Material for Electric Utility Companies," appeared in September.

The present report discusses in detail the competitive situation which will confront utilities in the industrial and commercial fields as the war draws to a conclusion. The analyses are divided into sections devoted to the availability and prices of competitive fuels, present and future trends in power generating equipment, and the probable trend in competitive heat utilization.

In the matter of supply and price of coal, petroleum, and gas, the report indicates that ample supply of these fuels will be available in the years immediately following the war at prices somewhat higher than those existing prior to the start of the war. Increases in fuel prices will tend, to some degree, to increase the cost of power generation by competitive equipment.

With respect to generating equipment and the trend in competition from that source, it is pointed out that there will be a number of design improvements tending toward less weight per horsepower. Despite increased costs of labor for manufacturing, the selling price of competitive equipment may be considerably lower than the prices extant prior to the war because of improved manufacturing methods and the mass production of such equipment attained during the past three years. Unquestionably there will be a great number of war-trained operators available for plant operation, particularly Diesel power plants. A large quantity of used equipment will be available at low cost.

With the possible exception of the gas turbine, which will not be a factor in competitive power generation in the immediate postwar years, there have been no startling developments which tend to change materially the competition to be expected from Diesel engines, gas engines, steam engines and steam turbines in the years ahead. The relative importance of lower equipment cost and improved design versus higher operating labor cost and increased fuel charges depends on many unpredictable variables and local conditions.

With regard to present and future trends in competition in heat utilization it may be said that great advances in the application of electricity to heating processes have been made. Because of the convenience of this method of heating and the high quality requirements of war material it would be wise to review many installations that have been made during the war period so that the manufacturing costs can be controlled in the highly competitive postwar market.

The conclusion may be drawn from the report that utility sales organizations covering the industrial and commercial fields should be set up on an extremely flexible basis so that they will be able to cope with any active competitive situation. Training of sales personnel should be undertaken immediately along the lines effective in meeting competition prior to the war. Commercial and industrial customers should be called on more frequently so that assistance can be given them at the formative stages of their plans for the future, thereby protecting ourselves and helping the customer to meet his own competition in his postwar market. In the industrial field time should be devoted to improving production methods, and in the commercial field emphasis may well be placed on improved merchandising and other methods of increasing the customer's sales. For while it is true the loss or gain of business through competitive power plant negotiations is governed largely by salesmanship, intelligent and continuous customers' service is always the best insurance for its retention and growth.

Maintenance of Service on Customers' Premises

Automatic Circuit Breakers for Circuit Protection

Prepared by the Wiring Committee, E.E.I.

FOR modern circuit protection and to overcome all the objections to fuses,* such as replacement difficulties, tampering, overfusing, etc., the time has come to consider the universal use of circuit breakers. When they open an overcurrent they may be immediately reclosed, like a wall lighting switch, without delaying to locate a replacement element. Circuit breakers meet every requirement yet conceived for circuit protection, whereas any fuse yet considered does not in a number of respects. Safety and convenience of use are outstanding features.

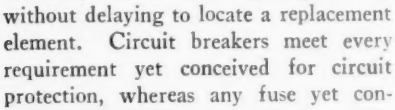


Fig. 1—A Typical Single Pole Automatic Circuit Breaker Unit.

Since 1929, when circuit breakers for use on customers' circuits were introduced, many important developments have been made so that satisfactory breakers are now available at costs quite competitive with fuse-type equipment. Today there are about 2,500,000 circuits in commercial and domestic installations equipped with these devices. Their record of service has been particularly satisfactory. One public utility which has 30,000 out of 40,000 customers equipped with circuit breakers has compared trouble calls in two comparable areas, one 75 per cent equipped with fuses and the other 100 per cent equipped with circuit breakers. Approximately four times as many calls are experienced in the fuse area as in the breaker area. (See Table 1.)

Three general forms of low-voltage circuit breakers have been developed:

(1) Thermal time-delay type;
(2) Magnetic instantaneous and time-delay types;
(3) Combination thermal and magnetic types to provide time delay on small overloads and instantaneous operation on overloads beyond some predetermined value.

For most applications a definite time delay is required to prevent momentary overloads, like motor starting, tripping out a circuit. To protect against larger overloads and short circuits, fast tripping is necessary. Breakers equipped solely for instantaneous operation on predetermined values of current have limited application and should not be considered for general use.

While the types which provide time delay for small overloads and instantaneous tripping for higher values have some advantages over the purely thermal types without such features, the cost will probably be somewhat higher. Since the straight thermal types have given satisfactory service they will without doubt have many, if not general, application, although the types providing time delay for light loads and instantaneous tripping for short circuit, if competitive, may be considered for general use.

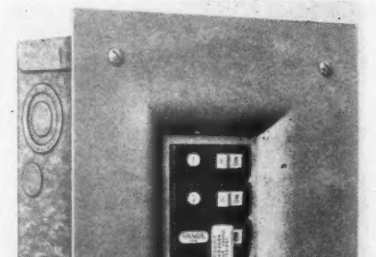


Fig. 2—A Typical Circuit Breaker Combination for Use as Service Equipment Made Up of a Number of Single Pole Units.

Note: This particular combination provides for 1—3 wire range circuit and 4—2 wire or 2—3 wire Branch circuits.

Advantages of Circuit Breakers

Outstanding advantages of automatic circuit breakers for customers' circuits have been arbitrarily segregated below to indicate how they meet circuit requirements and serve users, utilities, contractors and inspectors.

TABLE I—ANALYSIS OF SERVICE CALLS FOR 9 MONTHS OF 1941

		Service Calls — Transformer						
Zone	No. Meters	Plug Fuses Blown	Breaker Tripped	Fuse Blown	Inside Trouble	Total Calls	Total Calls/Meter	% Customers Having Breakers
1	14,146	2,620	244	116	361	3,341	.236	30
2N	2,095	107	8	36	5	156	.075	75
3N ..	395	16	—	1	6	23	.058	95
2W	976	24	10	10	4	48	.049	95
3W	596	27	5	8	1	41	.069	95
4W	312	16	—	9	1	26	.083	95
Total	18,520					3,635		

Average service calls per 1000 meters for fuse equipment..... 320
Average service calls per 1000 meters for circuit breaker equipment.. 33

EXPENSES—9 MONTHS OF 1941

	Labor	Auto.	Material	Total	Total Calls	Total Per Call	Total Per Meter
Fuse Replacement	$3,308	$916	$216.67	$4,440	3,635	$1.22	$0.24

* The Wiring Committee of EEI has prepared a discussion on "The Plug Fuse Situation," a condensation of which is available on request to EDISON ELECTRIC INSTITUTE, 420 Lexington Ave., New York 17, N. Y.

A. *Circuit Protection Advantages*

1. Provide the necessary time-delay for momentary overloads and thus prevent unnecessary interruptions to service.

2. Provide the fast operation required for extension-cord or appliance short-circuits and yet can be immediately and conveniently reclosed to restore service when the faulty device is disconnected. There is nothing for the user to replace, as is necessary with a fuse, and there is no necessity for tampering. Restoration of service merely requires the operation of a switch handle.

3. Circuits cannot be seriously overloaded with circuit breakers installed and it is most difficult if not impossible to increase their rating in contrast with fuses of all types.

4. Provide the required protection for circuit faults and service cannot be restored so long as the fault exists.

5. Serve as a circuit-disconnect device in addition to over-current protection.

B. *User Advantages*

1. Service may be quickly and conveniently restored when an interruption due to most electrical faults occurs. Not necessary to have a new fuse available, use devious expedients to restore service, or wait for the power company or contractor service man. Merely remove the cause of the trouble and flip the breaker closed again.

2. Adequate, safe and modern circuit protection is provided that is not readily destroyed or interfered with by the layman.

3. Complete flush-mounting designs of unobtrusive appearance will, in general, permit a more convenient location of protective equipment, making it unnecessary to go to basement or attic fuse cabinet to restore service.

4. Cost may be slightly higher than for fused equipment in some cases. In any case the convenience of circuit breakers will justify their use.

C. *Utility Advantages*

1. Result in lower operating costs because of decreased fuse-service calls, irrespective of whether or not a charge is made for such service. Such charges seldom if ever cover the entire costs of the service.

2. Exclusive use in the territories served will eliminate the difficulty and confusion that will attend the mandatory use of Type S fuses when fused-type equipment is used.

3. Greater probability of improved continuity of service, especially in rural areas, warrants their universal promotion. Rural customers are solely dependent on continuous service for electric pumping, refrigeration, incubators, etc., and many customers for the operation of oil, gas and stoker-fired furnaces for house heating.

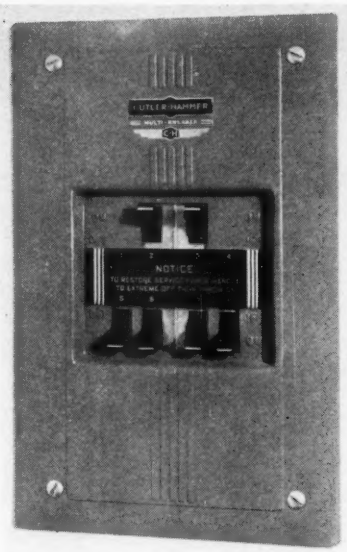


Fig. 3—A Typical Circuit Breaker Combination for Use as Service Equipment or as Distribution Panel Board Made Up of Multiple Pole Units.

Note: This particular combination provides for 6—2 wire or 3—3 wire Branch Circuits.

4. Prevent overloading of circuits and thereby limit voltage drop, permitting more satisfactory appliance operation.

5. Will foster installation of proper copper capacity in branch circuits because of Item (4).

6. Will provide the customers with equipment that represents the best modern engineering practices for electrical protection, safety and convenience.

7. Will result in improved customer satisfaction with the service supplied and as a consequence, improved public good will.

D. *Contractor Advantages*

1. Improved customer satisfaction which will enhance contractor's reputation and bring more work.

2. More sightly and pleasing appearance of the installation.

3. More convenient location of the equipment for the customer.

4. Overall cost may be lower even if the breakers may cost a little more.

5. Circuit overloading cannot occur so more business in rewiring and added wiring may be expected. This will not be the case with the Type S fuse or other fused equipment.

6. Fewer trouble calls and no fuse replacements which are generally items of increased expense and grief.

7. Better cooperation from utilities may be expected in wiring promotion when wiring involves circuit breaker protection for reasons under Utility Advantages.

E. *Inspector Advantages*

1. Truly tamper-resisting and answer all the requirements of circuit protection.

2. No gadgets or adapters to be checked to see if properly installed or that they remain in use.

3. Eliminate one of the principal objections to the Edison base fuse, which is the reported use of unapproved fuses.

4. Fully approved by the National Electrical Code and Underwriters' Laboratories, Inc., and accepted nationally.

5. Universal use will eliminate the confusion which will attend the use of Type S fuses and for which the Inspector who requires them will surely be blamed by the people in his community.

6. Solves the problem of overfusing and bridging protective devices.

7. Safest for the customer to use.

8. Most convenient and efficient.

9. Prevent circuit overloading and consequently stimulate rewiring where more adequate capacity is required.

Cost Comparisons

Fuse equipment, because of its simplicity and widespread use, long held a price advantage over any circuit breakers that could be developed to meet industry requirements for use on customers' circuits. But the marked advantages of circuit breakers over fuses and the rapid reduction in their cost since 1929 have stimulated their application to the extent previously indicated. Since that date their price has been reduced about 50 per cent, so they are now quite competitive with fuse installations, considering the simplification they have permitted in service equipment, their convenience of location and use, superior overall protection of circuits, and elimination of problems associated with fuses.

It is difficult to set up a satisfactory comparison of the net costs of equivalent circuit breaker and fused equipments because of the many different varieties

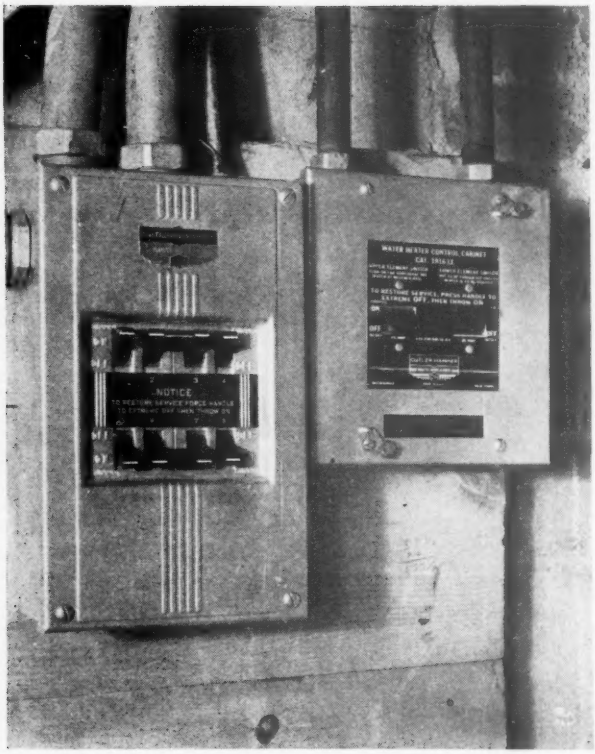


Fig. 4—Surface Type Installation of Circuit Breakers for Service Entrance to Provide for:

1—3 Wire Range Circuit
1—3 Wire Feeder Circuit
4—2 Wire Branch Circuits
1—2 Element Water Heater

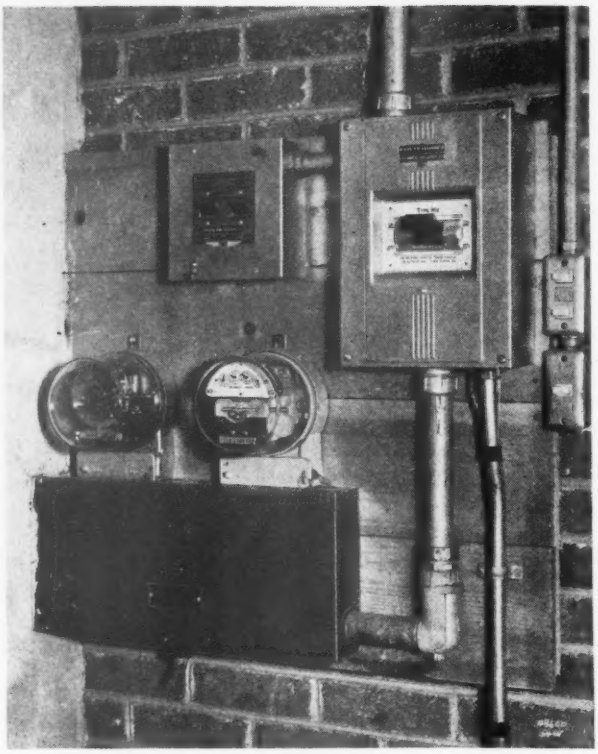


Fig. 5—Surface Type Installation of Circuit Breakers for Service Entrance to Provide for:

1—2 Element Water Heater
1—100 Amp, 3 Wire Main. (This is required only when the total operating handles for the service excluding the water heater is more than six.) Distribution for branch circuits not shown.

of fused switch equipment permitted or required in various localities. But the following comparison based on standardized combinations which have been used extensively in recent years indicates that an economic barrier should not be taken for granted. There are a great many ways in which circuit breakers may be arranged and used to reduce costs over other and more orthodox arrangements. To arrive at minimum costs, some ingenuity and engineering attention may be required.

While the cost of circuit breakers may be somewhat higher in some cases (the most pessimistic data showing only a small differential in dollars, usually insignificant, in favor of a complete fused wiring job), any slight additional cost for residential or commercial installations is more than justified by the convenience and safety afforded.

RELATIVE COST OF FUSED AND CIRCUIT BREAKER EQUIPMENT

1. *Fused Equipment*
   1—50 amp.—120/240 V—3-wire fused main switch
   1—35 amp.—120/240 V—3-wire fused range circuit
   4—30 amp.—120 V —2-wire fused branch circuits

List Price	$9.50
Fuses—2—50 amp.—240 V	.60
2—35 amp.—240 V	.60
4—15-30 amp. Type S	.30
4—15-30 amp. Adapters	.30
Total	$11.30

Suitable discounts should be applied as required.

2. *Circuit Breaker Equipment*
   Main service switch not required.
   1—35 or 50 amp.—120/240 V—3-wire range circuit
   4—25-25 amp.—120 V—2-wire branch circuits

List Price	$11.00

Suitable discounts should be applied as required.

Conclusions

A true engineering analysis of the requirements of circuit protection will invariably show that the modern time-delay automatic circuit breaker will meet the requirements better than any other protective device. Circuit breakers answer all the complaints against fuses, such as tampering and inconvenience. Field experience proves them to be adequate, safe and reliable over long periods of time.

A new joint committee of the Meter and Service Committee of EEI and the Committee on Metering and Service Methods of AEIC has been recently formed to further the development and standardization of circuit breakers for domestic use. This activity, no doubt, will increase their general use and result in additional reductions in costs similar to the radical reductions during recent years. If any economic barrier to their use seems to exist now, and actually it does not, even the appearance of it will be removed.

Job-Training By Models

By Edmund R. Paige

Superintendent of Technical Training, Buffalo, Niagara & Eastern Power Corp.

From a talk and demonstration before the Transmission and Distribution Committee, EEI, Buffalo, N. Y., Oct. 9 - 10

IN the Buffalo, Niagara and Eastern Power Corporation, we have found that job-training by means of demonstration models is one good way to give some formal job-training to linemen, troublemen, cable splicers, etc.

Illustrated in Fig. 1 are some miniature single-phase transformers which we use in teaching transformer connections. The secondary voltages of these models are full scale, i.e., the customary 120/240 volts. The primary voltages, however, are only 120 volts. Each transformer has a rating of 50 volt-amperes. The core and coils of each make an assembly about the size of a man's fist; and they each cost $2.00. We have constructed six so that our men can practice paralleling two banks of three each. They are useful, in addition to the teaching, for imitating peculiar conditions in the field, and then analyzing them.

To illustrate their use in teaching, let us suppose, for example, that it is desired to demonstrate the aid which a voltmeter can give in connecting three single-phase transformers to make a star-delta bank—4 kv primary, 120 volt secondary. Using three of these models completely connected, that is, points 7 and 8 joined as shown in the diagram, Fig. 2, the voltage is 120 volts from points 4-5, or 5-6, or 6-4. Now, the connection 7-8 is opened and it is assumed that a student lineman wants to make a test across 7-8 to determine if the connections are correct. (We instruct our men to use a voltmeter for this test, though there is another way of doing it. We encourage the use of the voltmeter wherever it is applicable.) If the connections are correct, what voltage should the lineman find between 7 and 8? Our instruction to the men is that this voltage will be one to one and one-half times the normal secondary voltage (120 v in this case) if the connections are correct.

As to why this voltage is not zero, we explain that it is related to the excitation of the core and that it is a 180 cycle voltage and not a 60 cycle one, and disappears without an arc when 7-8 are shorted. If, however, the connections are incorrect, in that one winding is reversed, our rule for the men is that the

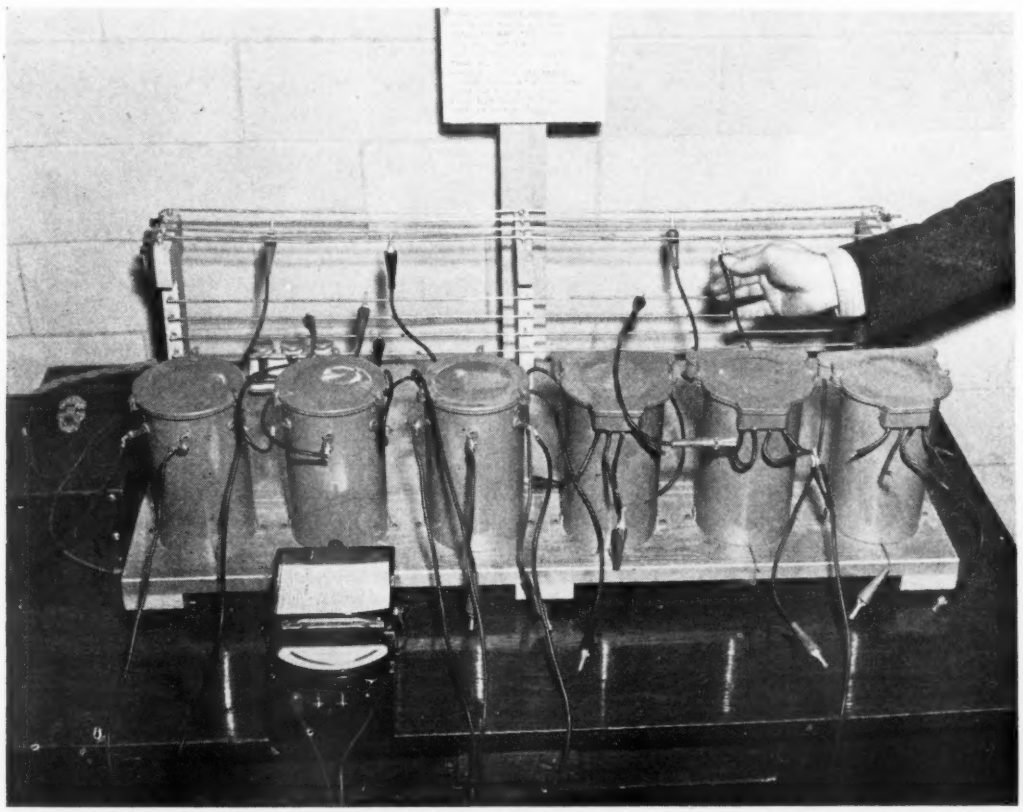


Fig. 1—Models of distribution transformers with which linemen can practice the various connections. The secondary voltages of the models are full scale, i.e., 120/240 volts, but the primary is only 120 volts.

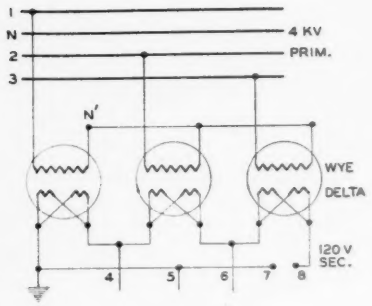


Fig. 2

mal voltages is a break that has occurred in the neutral connection on the primary side, between N and N′. Having previously demonstrated this to the troubleman by means of these models, he is prepared to find the cause of the high voltage—assuming that he remembers his lesson. The explanation again lies in the subject of harmonics in transformer connections. However, don't take away the impressions that we do job-training with linemen to the extent that

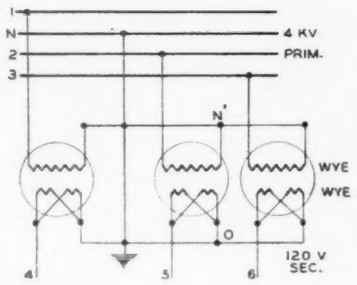


Fig. 3

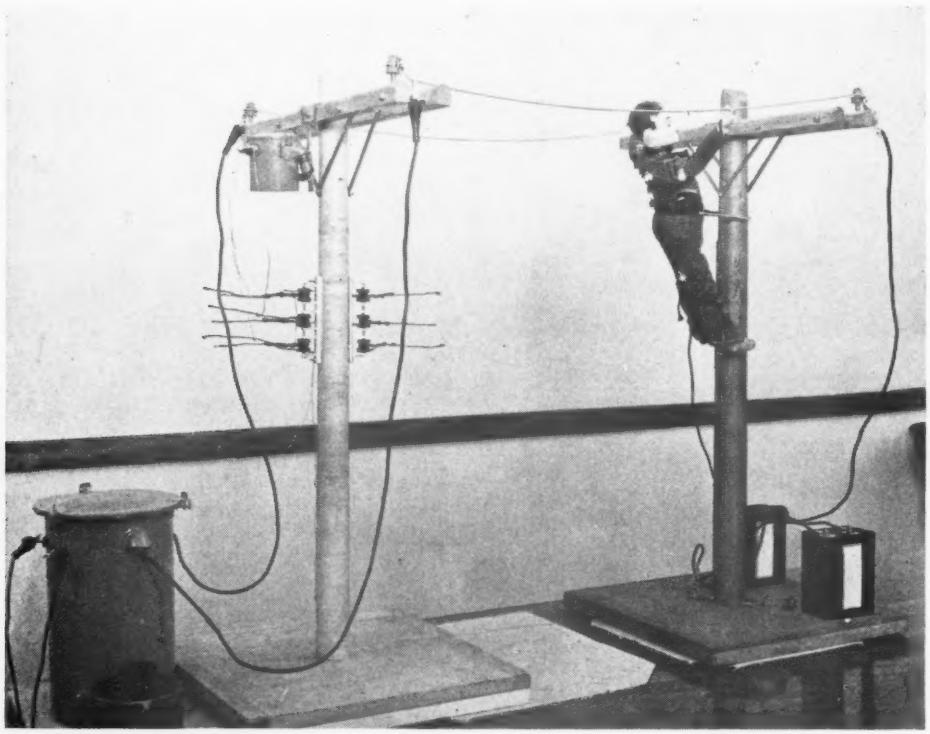


Fig. 4—The model lineman is wired with flash-light bulbs such that they light and trace the path of the current through his body when he is positioned to receive a shock. In this demonstration he has his hand in contact with a phase wire and his climber in contact with a ground wire. Even though this is an ungrounded system, a current passes through his body. In a real situation, this current would be large enough to kill a man.

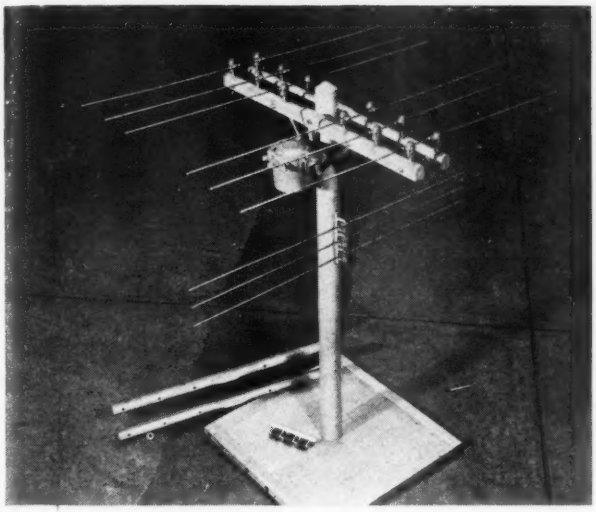
voltage at 7-8 will be more than twice the normal secondary voltage as is demonstrated to the students on the voltmeter screen. Why is this not just twice? Here again the explanation lies in the excitation of the core, that is, lies under the general subject of harmonics in transformer connections.

By way of further example consider the star-star connection of our model transformers, Fig. 3. Suppose a troubleman had to determine why the secondary voltages 4-0, 5-0, 6-0 are higher than normal when the primary feeder voltages are normal. Further, let us assume that the reason for the higher than normal voltages is a break that has occurred in the neutral connection on the primary side, between N and N′. Having previously demonstrated this to the troubleman by means of these models, he is prepared to find the cause of the high voltage—assuming that he remembers his lesson. The explanation again lies in the subject of harmonics in transformer connections. However, don't take away the impressions that we do job-training with linemen to the extent that we teach such theory as harmonics. They take the facts on faith, though we have on occasions shown the facts with the aid of an oscillograph where it would increase their attention by giving some spectacular interest to the demonstration.

Fig. 4 shows a model lineman wired with flashlight bulbs to show the path of the current through his body. This particular demonstration shows him receiving a shock from an ungrounded primary system. He has one hand touching the primary conductor and his climber is in contact with a ground wire. The capacitors shown at the base of the pole, provide in concentrated form, the distributed capacitance which in the field is formed by the primary conductors and the earth. The lighted lamps show the path of the current which all too frequently produces a fatal shock.

Other illustrations of job-training by the use of models are shown in Figs. 5 to 12, inclusive. Notice in all of them that safety and job-training are very much intermingled.

Job-training by means of models is a good method. It holds the attention of a group, is easier for the instructor, and is especially good when giving individual instruction. However, there are other good methods which have advantages



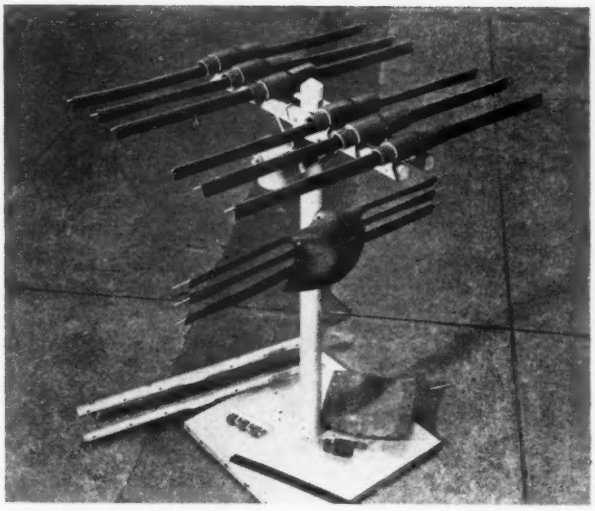
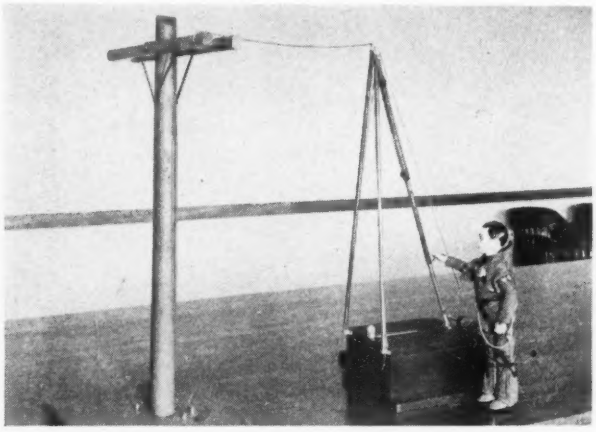


Fig. 5, left above, shows a model distribution pole, and Fig. 6, right, shows the same pole properly covered with rubber protective equipment.



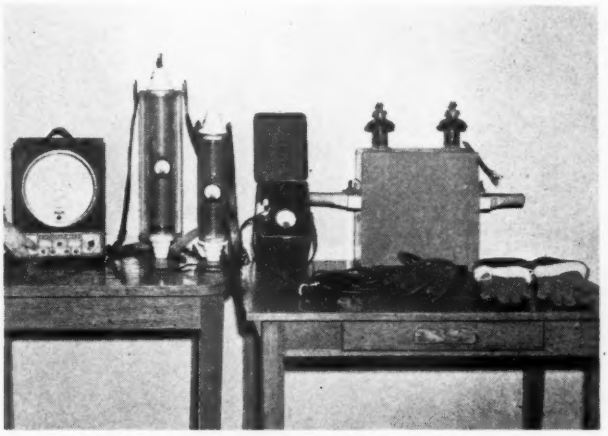


Fig. 7, left above, shows model lineman receiving an electrical shock from touching a truck mounted derrick which has become energized through contact with an overhead primary conductor. Fig. 8, at the right, shows full size, not miniature, demonstration models. This lesson covered two subjects: procedure for removing pole-mounted capacitors from service, and the use of the self-contained primary circuit voltmeters. They are the two tubular instruments at the center of the picture. The larger one is for 15 kv., the smaller for 5 kv. Being able to conveniently measure the voltage of a distribution feeder is important in getting linemen familiar with the basic facts of electricity.

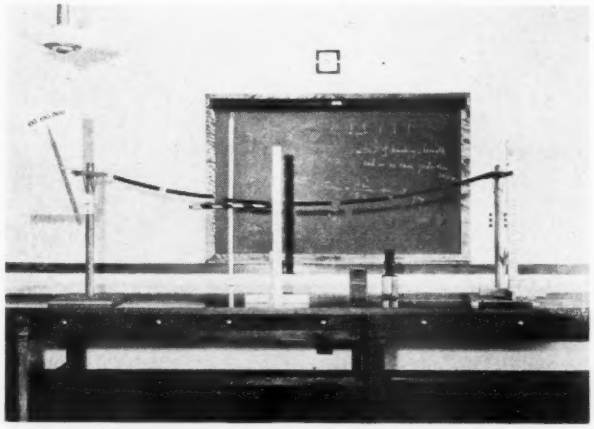
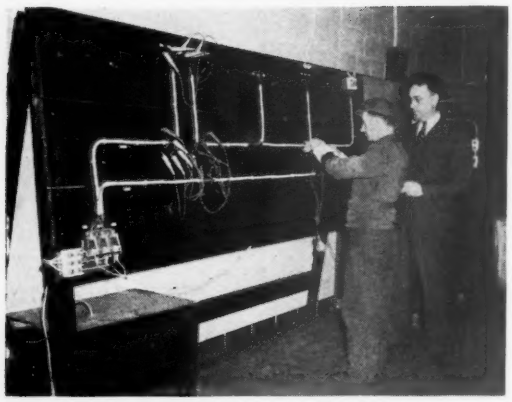


Fig. 9, left above, shows a model used in teaching a lesson on sagging of conductors, and Fig. 10, right, shows a miniature underground cable system and a lesson in the use of fault-finding equipment.



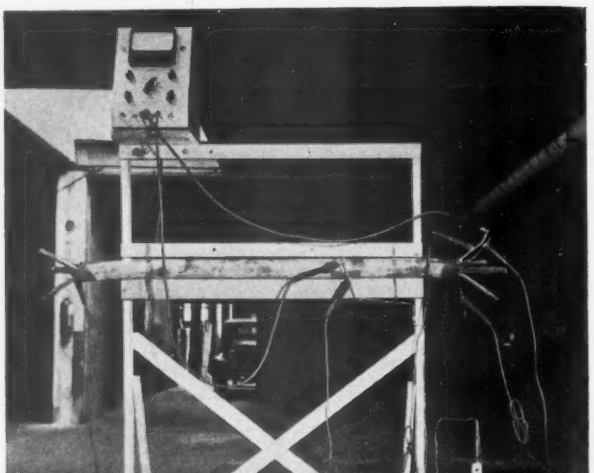


Fig. 11, left above, shows a miniature feeder cable and a splicer receiving a lesson in phasing at a splice and Fig. 12, right, shows a demonstration model which is used to explain the cable-static draining device. The device is shown in the lower right-hand corner and connected to the three phase cable shown in the center of the picture.

over this method. There is a great deal of time required to plan and make these models. Are they worth their cost? Wouldn't a good blackboard and a piece of chalk in the hands of a capable person be in some cases just as effective and so much cheaper? I think it is evident that it would be, and it has the advantage of getting our linemen to express their thoughts through the medium of sketches. Possibly we have resorted to models, so generally, because the linemen think in terms of material objects. It is evident, therefore, that each method has its place and its advantages.

Duquesne Light Company Reveals Post-War Sales Policy at Dealer's Meeting

AT one of the first post-war dealers' meetings of the electric appliance industry, which was held at Pittsburgh, Thursday, November 2, the Duquesne Light Company revealed its basic post-war sales policies before an audience of about 800 dealers, salesmen, manufacturers, distributors, and their representatives. George W. Ousler, Vice-Presiden in Charge of Sales, outlined the following post-war policies:

1. Duquesne Light Company will actively promote the sale of electric ranges and electric water heaters, as well as all other electric appliances and lighting equipment that play a part in the electric way of living.

2. In the existing wired homes, the Duquesne Light Company will contribute to the cost of changing the customer's service entrance wiring to accommodate the operation of the range and water heater. This will enable the dealers to sell ranges at an installed price, and thus eliminate the wiring problem.

3. Duquesne Light Company will not merchandise appliances. All electric appliances used in the home will be actively promoted by the Duquesne Light Company in cooperation with the dealers, but all these appliances and lighting equipment will be sold by the dealers.

Mr. Ousler felt certain that the dealers, backed up by the distributors and manufacturers, would be able to do a job of merchandising that would produce satisfactory results; and the merchandising policy is subject to only one reservation, namely, that if future experience proves the decision to be wrong, Duquesne Light Company might be forced to reverse its non-merchandising policy.

Duquesne Light Company intends to promote aggressively, the use of all electric appliances, by creating a desire for this equipment, and by doing everything possible to open up the market and put the dealers in a position to make sales including advertising, dealer helps and a complete sales program. The responsibility for the future success of the program depends largely upon the enthusiasm, work and money invested in the program by manufacturers, distributors and dealers, said Mr. Ousler, and he urged dealers to build up their sales forces and train them properly, advertise their merchandise, display it in attractive, in well-arranged stores, and carry out the program in a vigorous manner.

George A. Gardner, Residential Sales Manager, Duquesne Light Company, then presented figures showing the saturation of various electric appliances in Pittsburgh, as compared with national figures. Other charts also showed the widespread interest in electric cooking in the Pittsburgh territory.

One of the most serious obstacles to electric range sales is the range wiring problem. The Company proposes that a central agency be established to handle the wiring problem and serve the following purposes:

1. To represent a united industry for securing the adoption of simplified wiring practices.

2. To serve as a central point for handling the wiring installations for all ranges sold in the Duquesne Light Company territory.

3. To assign range wiring jobs on the basis of competitive bidding to contractors who may be interested in this type of work.

Pressly H. McCance, President of the Duquesne Light Company, gave hearty endorsement to the new policies and emphasized the importance of the new electric range and water heater program in creating post-war jobs over the entire span from manufacturer to customer.

Underground Conduit System Installation Using the Tunnel Construction Method

By P. B. Boyd
Georgia Power Company

Presented before Meeting of the Transmission and Distribution Committee, EEI, Buffalo, Oct. 9-10.

THIS paper describes the installation of an underground conduit line comprised of fiber duct encased in concrete by the tunnel method.

The usual and well known method of installing fiber duct is to excavate a trench to the required depth between manholes, grade the trench, lay the ducts in the trench by the built up method or tier method, backfill and if the conduit installation is under a paved roadway or sidewalk, replace the paving. If the ducts have to be laid at considerable depth below the surface it is also necessary to shore up the excavation to prevent cave-ins and to provide safety to the workmen.

The foregoing method has been used in Atlanta from the start of the use of fiber duct to this day. Up until 1929 it was used exclusively. In 1929 because of the increase of a-c load in the downtown area (changing over of d-c load to a-c construction of new office buildings and installation of air conditioning) it became necessary to construct many additional conduit lines, manholes and transformer vaults. Many of these lines had to cross under the street railway system's tracks and there the open trench was objectional both to the street railway system and also the city, as often it became necessary to block one half of the street and sometimes the entire street to vehicular traffic. To relieve this traffic congestion, a tunnel was excavated from one side of the street to the other and this tunnel filled with fiber duct encased in dry mix concrete similar to that used in the tier method for the installation of fiber duct and the spare space backfilled with dry earth carefully tamped. The tunnel method for the installation of underground conduit lines in Atlanta thus had its beginning.

During the development period the tunnel method for the installation of conduit lines was regarded dubiously by the city of Atlanta. In the early days of its use the city, which did all the street paving, would break down the paving over the tunnels and often excavate the earth down to the newly installed conduit line to determine if the earth had settled or if any spaces in the tunnel had not been properly backfilled. However, as it became more and more desirable to use the tunnel method for the installation of conduit lines, more thought was put to the construction of the tunnels. The tunnels were reduced to the minimum in width and height and were backfilled only with concrete. The Inspectors for the City were asked to inspect the tunnels during the backfilling. The City finally became convinced that neither excavating down to the newly installed conduit lines nor breaking the paving over the tunnels was necessary. By the elimination of the repaving costs the tunnel method for installation of conduit lines became competitive in cost with the open trench method for the installation of conduit lines in paved areas.

Beginning in 1929 the traffic congestion in the City of Atlanta became progressively worse, the streets being narrow in width, good for two to four lanes of traffic. To relieve traffic congestion, some streets were changed to one way streets and parking was prohibited on the main streets during the rush hours. This congestion was due to the continuous growth of the city and as it grew additional underground utilities were required. Installation of such facilities further increased the traffic congestion, and the City questioned carefully the necessity of each proposed conduit installation and specified in most cases that the construction be done at night and the streets be kept clear for traffic during the day by boarding over the excavation.

During this period, the Georgia Power Company had to install many additional conduit lines and as the space at normal depths below the street surface for conduit line construction was congested by subsurface structures it was necessary to construct these conduit lines at greater depths. Use of the street under the street car tracks was undesirable because of street railway traffic, and it was found necessary to excavate deep trenches along side large water mains, large gas mains and sewers and often to support these structures by special shoring. Likewise in rebuilding old duct lines it was frequently necessary to temporarily support cables and the old duct structure. It was also necessary to open the ditch from one manhole to another, often an entire block, to insure being able to install the conduit line. In the rainy season unless heavy shoring was used in the trenches, cave-ins often resulted, endangering the other utilities in the street and making the street in part at times unsafe to vehicular traffic. The tunnel method for installation of conduit lines was finally resorted to where the trenches were deep and adjacent to other utility structures.

By 1936 the tunnel method had been developed to the point where its use even in the most congested areas of the city gave satisfactory results both to us and to the city and we have since used this method practically exclusively for the construction of all conduit lines where the cover on the conduit bank exceeds five feet. The advantages of the tunnel method for the installation of underground conduit lines are:

1. Traffic congestion is eliminated. Normal use of the streets can be provided for at certain hours if desired.

2. Greater safety to the general public and utility company workmen is provided during construction of the conduit line.

3. Other public utility structures are not endangered during construction.

4. Earth is removed from one point for 50 feet of conduit line and as it is not required again for backfill can be removed from the streets at once.

5. Large areas of paving are not disturbed, only approximately 20 per cent

of area over conduit line has to be cut and patched.

6. Rains do not flood trenches and cause cave-ins.

7. Construction can generally be done during certain daylight hours as the city and public are not inconvenienced by the construction.

8. Conduit lines can be installed at great depths without the heavy shoring required by the open trench method. Construction also need not avoid being adjacent or below other utility structures.

9. Cost is competitive with the open trench method for the installation of conduit lines in paved area. An addition of one foot or more in depth adds practically no addition in cost to the conduit line when the tunnel method of construction is used.

In the construction of the conduit line by the tunnel method, shafts or work holes are excavated on approximately 50 feet spacing along the conduit line. These shafts are 30 inches in width and 8 to 10 feet in length and are excavated to the depth of the grade of the proposed conduit line. Depending on the traffic conditions on the particular street, these shafts can be covered with removable planking or a street manhole cover can be installed temporarily over the shaft opening. The shaft should be shored as necessitated by the ground in which the excavation is made.

Tunnels are excavated each way from the shaft. With shafts on 50-feet centers, it is necessary to excavate the tunnel 20 feet from a shaft before meeting the tunnel excavated from the adjacent shaft. These tunnels can be held to a 27-inch width. The width of the normal conduit line installed is 17½ inches (normal conduit line: 10-4-inch fiber conduits two wide five high). The minimum height of the tunnel can be 30 inches. A five high conduit line requires a tunnel height of 37 inches. The tunnel is shored as necessitated by the ground in which the conduit line is installed. In the normal ground found in Atlanta, it is only necessary to shore the top of the tunnel. Timbers, 4 x 4 inches, on 48-54-inch spacing are used as uprights. These uprights are recessed in the walls of the tunnel to provide more working space in the tunnels. A 4 x 4-inch header is placed on these uprights and two 10-inch boards placed between these headers. If additional shoring is required due to loose earth overhead, intermediate supports are installed. The tunnel is graded and grade stakes are placed at approximately 25-feet intervals, one in each shaft or work hole and one in the center of each tunnel.

In laying the conduit line, the installation of the fiber ducts and concrete is started midway in the tunnel between the two work holes and the ducts laid from there toward the work holes. The sections of conduit lines are joined together in the work holes. To allow staggering of the duct sleeves it is necessary that the duct be provided in 5-foot lengths. To date we have been able to obtain 4-inch fiber duct in 5-foot lengths at no additional cost over 8-foot lengths. The concrete used is a 1:3:6 mix and should be sufficiently dry to bear the weight of a workman. As in the tier method of installing fiber conduit, the ducts may be spaced by precast concrete separators or removable wooden comb separators. As the ducts and concrete are placed in the tunnel, the shoring in the tunnel is removed. All space in the tunnel is filled either by duct or concrete.

In certain areas in Atlanta, the ground is very wet, although fortunately this is the exceptional case. It has been found necessary to construct some conduit lines in these areas and the tunnel method has been used successfully here also. In wet locations it is necessary to box the tunnel completely, using 2 x 10-inch lumber. To divert the water, a 6-inch sewer tile is often laid beneath the boxing. During the excavation from the lower work hole, the water will be diverted to the work hole where it can be easily pumped out. This sewer pipe is usually carried from manhole to manhole in the completed construction. By pumping one manhole in the area, several manholes can thus be emptied of their waters. In laying the conduit line, only the bottom timbers of the box are removed, this space is filled with concrete, allowed to harden and then the tunnel is filled with ducts and concrete.

Manholes can also be constructed without opening the entire area of the manhole from the street surface down. A 4 x 4-inch shaft is excavated from the street surface to the bottom of the manhole floor. This shaft is used as a work hole during construction of the manhole and as the upper part of the manhole chimney in the completed construction. If desired, the shaft, at the start, can be covered with a manhole cover. The manhole area is tunneled out from the shaft; the excavation being done in two parts. With one-half of the excavation completed, the manhole walls in the excavated portion are constructed of brick with mill type footings and keys for tying the floor into the walls. The other half of the manhole is then excavated, the walls constructed and then the floor is poured. After reshifting of the roof shoring, the manhole roof is constructed of brick and used railroad rails or I beams and then grouted in with concrete. The manhole chimney is then constructed.

After using the tunnel method for the installation of underground conduit lines in Atlanta since 1936 with such definite success, we plan to use this method for the installation of underground conduit lines in all cases where depth will permit. We have definitely established, the tunnel method eliminates traffic congestion, provides greater safety to the general public, and company's own workmen and does not endanger the company's or other public utility's structures during construction. We are now endeavoring to lower the cost of the tunnel method of construction. As mentioned previously the tunnel method is already competitive in cost with the open trench method in paved areas. We believe, however, that certain construction equipment can be adopted for use in the tunnel method of construction and the cost of same reduced.

The tunnel method for the installation of underground conduit lines was developed by our former Underground Superintendent, Mr. B. F. Colmer. Improvements have been made on the method by our present Underground Superintendent, Mr. R. D. Fox, Jr.

Absolute and Complete G.O.

"WE wonder if the people realize that the one utility in the United States which over the past twelve years has increased its rates is the United States Post Office. Electric service rates have been slashed, telephone (long distance) costs less and service is much improved, telegraph service costs less. But the one agency with an absolute monopoly and that of the most vital of all services, which has increased its rates —on letter mail by 50 per cent—is the United States Post Office. And it is the one agency where government ownership is absolute and complete."—*Salem (Oregon) Capital Journal.*

Testimony on Behalf of Electric Utilities at F.C.C. Hearing to Review Radio Frequency Allocations

(Continued from November EEI Bulletin)

GENERAL AND TECHNICAL TESTIMONY

RELATIVE TO THE APPLICATION FOR RADIO CHANNEL ALLOCATIONS REQUESTED BY THE LECTRIC AND GAS UTILITIES THROUGH COMMITTEE FOUR OF PANEL THIRTEEN OF THE RADIO TECHNICAL PLANNING BOARD

Presented by Charles T. Malloy

Member, Electric Utility Group, Committee 4, Panel 13, Radio Technical Planning Board

At the September 28th, 1944, Hearings, Docket 6651 of the Federal Communications Commission, Washington, D. C.

THE testimony I am presenting is based largely upon the experience of the Southern California Edison Company. However, it is truly typical of the operating experiences of other electric and gas utilities in the Rocky Mountain-Pacific Coast region. Below are listed a number of utilities and municipalities whose operating experiences have been similar to those of Southern California Edison.

Electrical Utilities

California Electric Power Company; Montana Power Company; Pacific Gas and Electric Corporation; Portland General Electric Company; Puget Sound Power and Light Company; San Diego Gas and Electric Company; Washington Water Power Company.

Gas Utilities

Pacific Lighting Corporation; Southern California Gas Company; Southern Counties Gas Company.

Municipal Organizations

City of Los Angeles, Department of Water and Power; City of Seattle, Department of Lighting.

History and General Need

Previous testimony of C4 members has adequately covered the history and general need of radio service in all sections of the country, including the Pacific Coast and States adjacent thereto. However, the unusual desert and mountainous conditions found in the Pacific Coast region are so different from those in the remainder of the country that it is desirable to review their effect upon the development of power utility radio communication in that territory.

Radio in the West Coast region was first used by the power utilities in the early 1930's when installations operating on the lower special emergency frequencies were made. These were in successful operation for a number of years, principally covering point-to-point service over distance up to one hundred miles or more.

Comparable Tests of Medium and High Frequencies vs. Very High Frequencies

With the advent of very high frequency equipment in the late 1930's, a question of their suitability for the special conditions encountered in West Coast operation was raised; and in 1937, extensive tests were made by the Southern California Edison Company to determine their comparative effectiveness for both point-to-point and mobile service.

A detailed description of these tests and further information relative to the subsequent development and operation of the radio facilities of the Southern California Edison Company are contained in Exhibits 1 to 6 of that company which are offered herewith as part of this testimony. I request that these exhibits be received and identified. (Exhibits not reproduced herein.)

Part I of this exhibit sets forth the results of the field tests just mentioned. These were made over desert and mountainous terrain covering a territory of 40,000 square miles centered about Alhambra, Cal., which is the location of the central dispatching headquarters and system communications center of the company. The tests were carried out intermittently during the greater portion of a year in order to observe the effect of any seasonal variations. Representatives of the country's leading radio equipment manufacturers collaborated in these tests which covered both point-to-point and mobile communications at elevations up to 6000 ft.

The equipment used consisted of one 40-watt portable unit operating on 2726Kc and four 10-watt and one 40-watt portable-mobile units operating on 31.6, 35.6, 38.6, or 41 mc.

Test Results

Results of these tests indicated that the comparative average coverage of the medium and very high frequencies with equal power output in all areas tested was 20 miles at 2726Kc vs. 2 miles at 35.6 mc. As was expected, the shadow effects on 35.6 mc were very pronounced. Many satisfactory tests were made using 10 watts on 2726Kc in the mountainous districts where the mobile unit was located in deep canyons with ridges several hundred feet high between the test point and the fixed station. The very high frequencies were completely inoperative at such locations.

Surprisingly unsatisfactory results were obtained with the very high frequencies over flat desert terrain during dry weather. With no obstructions in the line-of-sight range the signals from a 40-watt fixed station with a 60-ft antenna elevation were attenuated below readability within a few miles. A 10-watt unit operating on 2726Kc worked across approximately 40 miles of this same terrain.

While no experiments have been conducted with FM equipment under similar conditions, it is believed that there will not be sufficient improvement over AM performance to overcome the advantages inherent in the medium frequencies.

The results of these tests clearly indicated the superiority of the medium frequencies for both point-to-point and mobile service under the peculiar conditions encountered. As a result, the Southern California Edison Company planned to develop their operations on 2726 and 3190Kc. The 2726Kc channel, however, was available to other special emergency services, and previous experience with it had demonstrated that during times of storms, floods, earthquakes, etc., local use of the channel was completely taken over by the American Red Cross, Los Angeles Flood Control and other agencies affected by the disaster. This situation was most unsatisfactory, and the Southern California Edison Company applied for additional channels. As a result of their efforts, the frequencies of 2292 and 4637.5 Kc, for limited power night and day operation, were allocated.

Operating Experience with Medium Frequencies

During the approximately four years subsequent to the date the first radio station was licensed on 2292Kc, thorough coverage of the desired area has been obtained and the channel is considered to be entirely satisfactory.

These tests and operating experience of the Southern California Edison Company have been confirmed by similar tests made in Northern California, Oregon, Washington and Montana. Today all four frequencies are being used by West Coast utilities who have found them necessary to minimize interference difficulties during times when several special emergency services are simultaneously operating.

To indicate the extent of this use as well as the distances and topographical conditions which have to be contended with, maps of the Southern California and Pacific Northwest areas have been prepared and are included in Committee Four's Report as Exhibits 4.41 and 4.42. Further information with respect to the Southern California Edison Company's system is given on the maps identified in their exhibit as Parts 4, 5 and 6.

Parts 2 and 3 of that exhibit set forth data supporting the recommendation of the Southern California Edison Company for the retention of a medium frequency at or in the vicinity of 2292 Kc. They also present an evaluation of the service from the standpoint of public need and benefit. In general, the data therein are comparable with similar information presented to Committee Four of Panel 13 by other companies operating in the Far West, and I shall not take time here to review these exhibits in detail.

Power Limitation

Experience shows that the present limitations of 50 watts for the 2292Kc and 4637.5 Kc channels does not give required results for essential emergency service. Therefore, it is recommended that the power limitation for these channels be increased to 1000 w to make it comparable with that of the 2726 Kc and 3190 Kc channels.

Some of the electric and gas companies on the Pacific Coast and in States adjacent thereto operate on 2726 Kc where the power limitation is 1000 watts.

If in the reallocation of frequencies, it becomes necessary to substitute some other MF channel for 2726 Kc as suggested by the Panel 13 allocation, the power limitation of the substituted channel should be comparable with that of the relinquished channel. The maximum power would, of course, only be employed in cases where distances and terrain are extremely unfavorable; and as set forth in Mr. Underhill's testimony, the licensed power should not be greater than that required for satisfactory operation under the most unfavorable conditions normally to be encountered at the specific installation.

Joint Use of Channels

In August, 1941, the Southern California Edison Company extended the use of its stations to three gas companies: The Pacific Lighting Corporation, The Southern California Gas Company, and the Southern Counties Gas Company, under an agreement approved by the Commission.

These gas companies, collectively, operate over roughly the same area as that covered by the Southern California Edison Company. Their pipe lines extend for 300 miles or more into mountainous territory and their needs and requirements are very similar to those of the Edison Company.

In general, this arrangement has proven economical and practical. It should be pointed out, however, that at no time since the inception of this arrangement has California suffered a major catastrophe. Such event provides the real test of joint operation; and it is believed that, should the area undergo an earthquake comparable to that of 1933 or any similar disaster, the joint use of a single frequency would be taxed beyond its practical capacity and the service would fail when most needed.

Conclusion

In conclusion, I wish to state that the electric and gas companies now utilizing radio in the Pacific Coast area are unanimous in their conviction that medium frequencies are essential to the continuance of their operations. I do not imply that such frequencies are not also required in other sections of the country, or that the higher frequencies for localized operations are not needed and used by companies on the West Coast. My entire testimony has been directed toward the support of the Committee Four request that a few medium and high frequencies are essential if the unusual geographic and topographic conditions encountered in many sections of the country are to be adequately surmounted.

Ebasco Personnel and Safety Meeting

REPRESENTATIVES of 25 Ebasco client companies attended Personnel and Safety meetings in the La Salle Hotel, Chicago, Ill., October 1-6 taking back to their respective companies many ideas which they can put to work in their industrial relations programs. Eighty-four persons attended the various meetings held during the week, benefitting not only from the expertly planned papers which they heard and the subsequent discussions but also from the informal contacts and opportunity to exchange information and ideas with others.

Highlight of the conference was the talk by Mr. Rex I. Brown, President and General Manager, Mississippi Power & Light Company at the annual luncheon, held October 4. Mr. Brown emphasized that the help of every man and woman in the companies would be needed to solve the many problems which have to be faced.

STATEMENT ON BEHALF OF E.E.I. AND A.E.I.C.

RELATIVE TO APPLICATION OF THE ELECTRIC LIGHT AND POWER INDUSTRY FOR THE ALLOCATION TO IT OF CERTAIN RADIO COMMUNICATION CHANNELS

Presented by Philip H. Chase

Representing Edison Electric Institute and Association of Edison Illuminating Companies

Before Federal Communications Commission Hearing, Docket 6651, September 28, 1944

THE Edison Electric Institute and the Association of Edison Illuminating Companies jointly request to be heard on behalf of the privately owned electric light and power utilities in the United States, as the membership of these trade associations represent about three-quarters of the industry.

The industry supplies some 32 million customers and 100 million users throughout the nation and its investment of some 12 billion dollars is completely dedicated to the service of the public.

For many years the industry has used radio as a means of emergency point-to-point communication following the loss of regular communication lines and on many occasions this auxiliary service has proven of inestimable value in restoring electric service to stricken areas.

During the early 1930's the industry experimented with point-to-mobile systems as a means of more effectively directing the operations of its field units. These experiments convinced the industry of the desirability and practicability of such a service. Accordingly the Edison Electric Institute appeared before this Commission in 1936 and requested the allocation of additional radio communication channels on the basis of demonstrated need for the protection of life and property and for the public safety. A number of shared channels were granted as a result of this hearing.

On the 17 channels which are available today the industry operates some 725 stations or well over half the combined total of all industries operating under the Special Emergency classification. The bulk of this growth took place within the five years preceding Pearl Harbor and it offers convincing proof of the need for and effectiveness of emergency mobile radio communication in electric power utility operations. Today, the service is well established on a nation-wide basis and the records are replete with instances where it has rendered yeoman service in the protection of public life and property and in the prompt restoration of electric service which is so vital a necessity of modern life. Its value was again emphasized by the recent hurricane along the Atlantic Coast. Attached as Appendix A are excerpts from letters describing experiences of several electric utilities on this occasion.

It is hardly necessary to emphasize the common knowledge that every other public service from these in the safety group (police, fire, water, sanitation, etc.), through the necessity class (food, medical service, communications, transportation, etc.) to the luxury group (amusements, radio broadcast service, etc.) is directly or indirectly dependent upon electric service. Testimony presented by Mr. H. W. Eales, who represented the Institute before this Commission in 1936, fully covered these points and reference is made thereto if elaboration is desired. From a public service standpoint the use which the electric utilities today make of radio places it unquestionably on a level with that of the police or fire services.

Upon the formation of the Radio Technical Planning Board in 1943 the Edison Electric Institute became a Sponsor Member and has been represented on Commitee 4 of Panel 13 throughout its activities. The major task of Committee 4 has been to develop channel requirements and request channel allocations adequate to permit (1) an anticipated post-war expansion of emergency radio communication service, and (2) new uses, as for example in the automatic control of power system apparatus in situations where experience has demonstrated the impracticability of establishing or maintaining adequate and reliable wire line channels for this purpose.

The industry fully endorses the work of its representatives on the RTPB and I refer the Commission to the reports and exhibits of Committee 4 of Panel 13 for the detailed and technical support of this presentation. Specifically, the Committee shows the need for 51 channels for the use of the Electric Power Utilities. These are segregated by frequency groups in Appendix B.

In addition to these requests the Electric Power Utilities ask consideration of two additional and equally important matters which may be primarily the concern of this Commission rather than of the RTPB, as follows:

1. To have the status of its operations removed from the Special Emergency subdivision to a new section under the General Emergency classification. This is urged on the basis that the electric utility radio service has grown to a point where its specific problems and needs should be separately considered and where the continued sharing of channels with existing and proposed special emergency services outside the power utility field may create serious interference problems.

2. To seek a revision of existing FCC regulations which require emergency radio communication facilities and channels to lie idle until an emergency actually occurs. Use of these idle facilities and channels for preventive purposes during non-emergency periods would immeasurably increase the electric power utilities' ability to render improved public service and their continued non-use is held to be contrary to the best public interest.

Both of these objectives have been treated by Committee 4 of RTPB Panel 13 for the reason that they arise in connection with considerations of channel requirements.

In conclusion it may be said that the electric power utility industry foresaw and responded to the need for emergency radio in the public service by demonstrating its usefulness on a nation-wide basis. With that record behind it the industry now desires to expand its use of emergency radio not alone in the restricted, corrective sense but also to include preventive operations. By this means power utility emergency radio can truly fulfill its high purpose of contributing materially to the safety, benefit and convenience of all the people of the United States.

APPENDIX A—EXPERIENCE WITH EMERGENCY RADIO COMMUNICATION RESULTING FROM HURRICANE OF SEPTEMBER 14, 1944

Case 1—At 11:17 P.M. on Thursday, September 14 telephone communication between our Load Dispatcher and our principal hydro plant went out of service during the hurricane. It was not back in satisfactory operating condition until the afternoon of September 16. In the meantime 41 contacts were made by radio between the Load Dispatcher and the fixed station at this plant. These contacts were necessary to carry on the usual operating instructions concerning station loading and the switching and grounding of high tension lines which went into trouble.

Case 2—One town supplied by two 28 Kv lines from an unattended substation was without service when both of these lines went into trouble during the hurricane. A station attendant was sent to this substation to open the disconnects and ground the lines. Having completed this work, he found that the hurricane had also put the substation telephone out of service. This delayed his report to the dispatcher and the subsequent release of these lines to the repair crew.

Repairs were completed and reported to the dispatcher who sent another attendant with the radio car to the substation. As soon as he reached his destination he reported to the dispatcher by radio and under the dispatcher's direction the tags and grounds were removed, disconnects and breakers closed and power restored.

By use of the radio the dispatcher had continuous contact with the attendant from the time he left until his return. No guess work was involved, safety rules were complied with and the duration of the outage was considerably shortened.

Safety of workmen is paramount and without the radio it would have been necessary to first locate a telephone in working order and then the various moves of removing tags, clearing grounds, closing disconnects and finally closing the breaker would have had to proceed step by step and would have considerably increased outage time.

Case 3—Portable radios sent out with the high line crews greatly facilitated repairs and when a line went back in service the crews were dispatched by radio to the next trouble point, thereby saving valuable time.

Typical of the general situation was one section of the system where distribution and telephone lines were badly damaged. Much of the service there is rural and while the main circuits in the towns were being repaired they also attempted to restore service to the large dairies, refrigerating plants, etc. Once having left the service building at daybreak the short handed line crews were out of touch with their base since phone service was nil and if they were urgently needed elsewhere it meant tying up a much needed man to locate them and deliver the message.

Case 4—As in former emergencies our radio was extremely valuable in direct handling of trouble and in providing means for field supervisory forces to contact their line trucks for special jobs.

Following is an analysis of radio use between 8 P.M. September 14 and midnight September 15:

Transactions	*Type of Work Handled*
233	Operating work on primary distribution circuits, such as: switching to restore essential services to hospitals, telephone exchanges, railroad signal services, water departments, etc. There were also several cases in which field men ordered circuits out of service due to emergencies.
116	Reports of wires down including primaries, series street lighting and secondaries.
60	Mobile units used to contact line trucks not equipped with radio for urgent assignments.
42	Reports of wires burning, not down.
38	Operating work on series street lighting circuits, mainly ordering circuits out of service due to hazardous conditions.
24	Electrical equipment flooded in buildings.
23	Group reports of service outages indicating wires down.
14	Reports of poles down or in dangerous condition.
550	

Case 5—The following illustrations are examples of an extremely important function of radio, i.e., enabling field forces to quickly order circuits out of service in an emergency without leaving the scene of trouble:

At 10:50 P.M. September 14th a troubleman investigating trouble on circuit No. 5901 reported by radio, "Several primaries down in street, to cut clear." At 11:14 P.M. to the troubleman called for No. 5901 out on emergency on account of extreme hazard, and at 11:15 P.M. No. 5901 was taken out of service at the substation.

At 1:26 A.M. September 15th a radio equipped light line truck covering a report of a pole down reported, "Pole brought down by tree, carries circuit No. 1601 primaries and No. 1636 series street circuit. Primaries cut dead, want No. 1636 out on emergency." At 1:33 A.M. No. 1636 was taken out of service at substation.

Case 6—One of our more serious cases was where a transmission line feeding a substation serving a town lost its load. A crew was despatched by radio to go to the substation and report. The telephone service to this substation was interrupted. Feeder switches were found open and were reclosed but tripped immediately. There is a hospital in this town and instructions were given via radio to the crew to attempt to restore partial service on the feeder going to the hospital. Sectionalizing was involved as well as wire replacement and closing of the feeder switch. The instructions for the entire operation were handled over the radio. This illustration is typical of our use of the radio-telephone equipment. It was particularly valuable to us since we only had about one half our normal personnel until outside help arrived and also because it was practically impossible to find telephones which were in service in many of the affected areas. The time which would otherwise have been used in hunting for a telephone was used in making repairs.

APPENDIX B—REQUIREMENTS OF THE ELECTRIC LIGHT & POWER INDUSTRY FOR FREQUENCY ALLOCATIONS

Band Designation	*Region Desired*	*Channels Required*
M.F. (0.3—3.0 Mc)	2—3 Mc	2
H.F. (3.0—30.0 Mc)	3—6 Mc	2
U.H.F. (30—300 Mc)	30—40 Mc	15
	100—300 Mc	14
V.H.F. (300—3000 Mc)	300—1000 Mc	18
Total		51

Samuel W. Murphy

SAMUEL WILSON MURPHY, president of the Electric Bond and Share Company, died of a heart attack at his home in South Orange, N. J., on Nov. 20.

Mr. Murphy was born in Brooklyn on Aug. 27, 1892. He was graduated in 1913 from Wesleyan University and in 1916 from the Columbia University Law School, where he was editor in chief of the Columbia Law Review. Admitted to the bar in the latter year, he was associated first with the firm of Hornblower, Miller & Potter, and then with Geller, Rolston & Blanc.

After serving in the Navy during the World War, Mr. Murphy joined the firm of Simpson, Thacher & Bartlett. He first entered Bond & Share as an attorney in 1923, becoming general attorney from 1932 to 1934 and vice president from 1934 to 1935. From 1935 to 1937, he was a member of the law firm of Reid & Murphy.

Elected vice president of Bond and Share again in 1937 and a director in 1938, Mr. Murphy was chosen for the presidency in January, 1941. Much of his work concerned reorganization within the system to meet requirements of the public utility holding company act of 1935.

As company spokesman Mr. Murphy advocated a war-time moratorium on the death sentence for utility holding companies, arguing against the necessity for marketing assets in unstable and artificial markets. At the same time he directed studies which would employ the system's experience and personnel outside the utility field in industrial management and engineering, once the requirements of the 1935 act were met.

An opponent of "government ownership both in principle and in practice," he urged the government and the utilities to reach an understanding on the ownership problem, pointing out that in 1943, 12 per cent of the power industry was government-owned.

During his tenure, operating companies of the Bond & Share group which had generated more than 21,000,000,000 kilowatt hours of electricity in 1941, equal to a fourth of Germany's estimated output and half of Japan's, proceeded with a construction and improvements program designed to add still more generating capacity in the nation's war effort.

Federal Projects, Co-operatives Held Threat to Utilities

Taxation of Units Urged to Equalize Competitive Situation

By Shelly Pierce

In the N. Y. Journal of Commerce, Nov. 20, 1944

THE steady expansion of co-operatives and Government projects in the utility field, with their large measure of tax exemption, is offering an increasing menace to the electric utility industry, a survey of industry opinion indicated over the week-end.

With the industry's future seen at stake unless competition is placed on a more even basis, utility executives put high on the list of postwar tax measures for utilities a proposal that all co-operatives and Government projects be subjected to substantial taxation.

The matter of further inroads on the utilities was highlighted last week with the revival by President Roosevelt of the Administration project, first put forth in the earlier years of the New Deal, for seven more "TVA's" in accord with the pattern laid down with the development of the Tennessee Valley Authority. It was estimated recently that TVA would have a Federal tax liability of $15,000,000 or more annually if Government projects were taxed on the same basis as electric companies. A similar tax-exempt basis for the proposed Missouri Valley Authority has evoked opposition. This project was recently recommended to Congress by President Roosevelt.

Co-operatives Score Gains

Rapid strides are being made by co-operatives financed by the Rural Electrification Administration, which in turn is financed by Treasury funds and by loans from the Reconstruction Finance Corporation. Some of these organizations are developing ambitious postwar plans. For instance, the Kentucky Rural Electric Co-operative Corporation has proposed a three-year postwar rural electrification expansion program designed to serve over 46,000 new consumers and costing more than $15,000,000. This organization is also opposing an application by the Kentucky Utilities Co. pending before the State Public Service Commission proposing the building of 704 miles of power lines in sixty-four Kentucky counties.

There is also a continued acquisition of private companies by co-operatives, one of the most recent being the purchase of the Ohio Midland Power Co. by three Ohio co-operatives for $2,115,000. Utility company officials complain that co-operatives are in a position to outbid private companies in the buying of properties put up for sale by concerns seeking to comply with the provisions of the Public Utility Holding Company Act. They point out that in accord with the prudent investment doctrine, a utility cannot bid more than original cost, less depreciation, for a property. The co-operative, unhampered by such a restriction, can enter a bid slightly higher than that of the private company and obtain the property.

Borrowing Advantage Seen

Another complaint voiced against the REA is that the co-operatives which it finances not only enjoy a substantial tax exemption but that they can borrow money at low rates of interest and the amount so obtained can equal 100 per cent of the total investment made.

Statistics are cited to show the progress being made by the co-operatives. In 1935, the year of the creation of the Rural Electrification Administration, the electrical utility companies accounted for 94.1 per cent of the output of all electric utility plants primarily engaged in distribution. Municipal utilities provided 4.5 per cent and Government power districts 1.4 per cent. In 1943 the share of the total output held by the utility companies had fallen to 83 per cent, that of the municipal plants had dropped slightly to 4.2 per cent while the production of the power districts and REA co-operatives by this time represented 12.8 per cent.

The National Tax Equality Association has pointed out that, although electric companies paid $688,000,000 in Federal, State and local taxes in 1943, Government projects and co-operatives representing approximately 20 per cent of the installed generating capacity of the electrical utilities paid only an estimated $12,000,000 in taxes and tax equivalents. It was estimated that these would have incurred taxes of about $141,000,000 for the same period if taxed on a basis comparable to that of the electric companies. Meaning of this, according to the organization, is that customers of co-operatives and Government projects were subsidized $129,000,000 by taxpayers, particularly by customers of electrical companies.

Tax on Gross Urged

Grover C. Neff, president of the Wisconsin Power & Light Co., writing in the November issue of the EDISON ELECTRIC BULLETIN, called for modification of the revenue laws in order that all co-operatives and Government concerns in business be made subject to substantial taxes.

"Because of this very nature of these two types of business, because they can, by manipulation, cut their net earnings to a very low amount without injuring their credit, it is important that they be taxed on gross business done if the Federal Government is to realize its fair proportion of tax money from them," said Mr. Neff.

He suggested, therefore, that instead of bringing co-operatives and Government-owned concerns under the regular income tax law, they be made to pay in lieu of income taxes, 12 or 15 per cent on their gross business, and also be made to pay any other special taxes that may be levied against business. He said that the electric utilities pay 15 per cent of their gross revenue in Federal income taxes.

If the electric co-operatives and Government-owned electric utilities were similarly subjected to taxation, Mr. Neff argued, "then each utility customer, throughout the United States, whether served by a private company, a co-op, or a Government-owned concern, would pay to the support of his Government about the same amount in proportion to his use of service. Such an arrangement would bring about fair competition between the three groups and would not in any way be unfair to the co-op or to the Government-owned utility.

"The only other solution to the problem," he added, "is to reduce taxes on company business to the level now enjoyed by co-operatives and Government-owned business ventures."

(*Continued on page* 396)

Southeastern Electric Exchange Sales Conference

THE Sales Section Meeting of the Southeastern Electric Exchange held at Atlanta, Nov. 9-10, provided a forward-looking comprehensive program with the underlying theme of the electric utilities part in the economic progress of the section.

C. A. Collier, vice-president, Georgia Power Co., discussed the "Better Home Town" program of the company in which some 150 communities in the company's service area are now at work on preparations for improvement. Parallel with the Georgia program is that of the Carolina Power & Light Co., described by Vice-President S. Paul Vecker. Both of these activities aim at providing employment by development of local industries and by opening of opportunities in service trades and businesses.

Mr. Collier pointed out the credit provisions of the GI Bill of Rights and how that credit used in Georgia by Georgia soldiers returned home could actually remake the state. Local processing and manufacture of foods from local products for local markets will alone almost solve the problem of future unemployment in the Carolina area, said Mr. Vecker, who also said that plans now made for civic improvements will provide employment for many persons for two years after the war.

A revolution in the food industry accomplished by modern methods of refrigeration and freezing, in which electric service is a necessary part, was predicted by Clarence Birdseye, Birdseye Frosted Food Co. Today the annual production of frozen foods is a half billion pounds; by 1950 it will be three to five billions. Additionally, there will be fruit juice concentration by freezing instead of evaporation and refrigeration of produce from garden to consumer.

Full production of electrical appliances will be accomplished eight to nine months after the war's end, said J. H. Ashbaugh, vice-president of Westinghouse Electric & Manufacturing Co., who expressed doubt that any large volume of appliances would be snapped up by a waiting market. There will be as much need for promotion and selling post-war as pre-war because the consumer's dollar will be the object of intense competition.

Since the invention of the cotton gin, electric refrigeration will do more for the farms of the South than any other thing was the opinion E. C. Easter, manager, Rural and Towns Division, Alabama Power Co., expressed in his talk on the utility approach to the rural market of tomorrow. The aim of Alabama Power in its plans for farm service in its territory, said Mr. Easter, was 12,000 miles of line serving 70,000 customers at an average rate of 2¾ cents per kwhr resulting in a revenue of $3,500,000.

Two kinds of competition face the utilities in the coming new age of electronics, said R. B. Roberts, Jr., general sales manager, Florida Power & Light Co. One kind of competition is in the minds of utility people and customers. It resides in the fixed ideas of customers about the utilities and of utility people about their duties. Mr. Roberts would like to see the responsibility for all customer contacts in the hands of the sales department so as to avoid friction. The other kind of competition is external.

To illustrate its nature Mr. Roberts called on William Cashman, of Landers, Frary & Clark, who presented a comprehensive picture of plans of the oil industry for the promotion of "bottled gas" for cooking and heating uses in areas not served by piped gas. This competition will stiffly oppose the use of electric ranges and water heaters in rural and farm homes. One seventh of the possible electric range market has already been pre-empted by bottled gas, said Mr. Cashman. But the competition can be met and overcome, said S. S. Bradford, Potomac Edison Co., who described the methods used by his company to do so.

Out of the talk by A. H. Jaeger, Edison General Electric Appliance Co., on "Selling the All-Electric Home in Package Style," there developed a general discussion on how to enlist architects and builders in the program. That the electric kitchen idea is taking hold on the public is proved by the fact, said Mr. Jaeger, that Hotpoint advertising has already brought in a half million requests for kitchen planning books.

Continuous and more intimate contact with customers will be needed in the post-war period, said Miss Fern Snider, home service director, Georgia Power Co., as she told about the results obtained by the company's customer service program. That many electrical appliances are too complicated and could be greatly improved by simplifications of design was a point made by Miss Snider. Definition of the sales job is a prerequisite to the selection of salesmen, said W. E. Parrott, sales consultant, Ebasco Services, Inc., in his talk on selection of post-war sales personnel.

Roscoe Arant, regional business consultant of the United States Department of Commerce, spoke on "The Business Man in Southern Development—What Is He Going to Do About It?"

In addition to the subjects mentioned above, the meeting ranged over a wide field of utility sales interest—utility-dealer relations, C. M. Killian, Alabama Power; the farm market, A. D. Peabody, Westinghouse; progress in lighting, H. M. Horton, General Electric Co.; new industrial prospects, C. A. Mees, Georgia Power; recruiting and training industrial sales engineers, T. L. Bissell, Alabama Power; post-war industrial power, H. H. Startzman, Potomac Edison; power services to municipalities, W. P. Lyman, Carolina Power & Light; contract terminations and rate adjustments, E. D. Scott, Birmingham Electric Co.

Industrial power competition, F. C. Smith, *Southern Power and Industry;* high frequency dielectric heating, W. H. Hickok, Girdler Corp.; infra-red drying, R. F. Craig, Southern Industries Inc.; farm equipment distribution, F. E. Watts, *Farm Journal;* small agricultural industries, L. W. Gray, Georgia Power; farm dealer development, R. C. Poslay, Louisiana Power & Light Co.; training agricultural representatives, E. C. Easter, Alabama Power; plans for rural extensions, C. P. Spellman, Virginia Electric & Power Co.; developing farm load, G. W. Coble, *Electricity on the Farm.*

There was also a full day's session on utility advertising problems in which talks and papers were presented by Miss Dorothea Schlesinger, New Orleans Public Service, Inc.; Russell I. Seymour, Kansas City Power & Light Co.; James M. Stafford, Georgia Power; E. N. Pope, Carolina Power & Light; J. G. Bariesas, Council of Electric Operating Companies; Sam Schweiger, Southwestern Gas & Electric Co.

PERSONALS

CURTIS E. CALDER, president of American and Foreign Power, has resigned that post to become chairman of Electric Bond and Share Company, and GEORGE G. WALKER, formerly vice-president of Bond and Share, was elected president of the company. Mr. Walker succeeds Samuel W. Murphy, who died recently.

C. E. GROESBECK, formerly chairman of Bond and Share, will take on the new post of chairman of the company's executive committee. LESTER B. WIEGERS, secretary and treasurer of Bond and Share, was elected vice-president of the company, and B. M. BETSCH, was named assistant secretary-treasurer. W. S. ROBERTSON, vice-president and a director of American and Foreign Power, was elected president of the company to succeed Mr. Calder.

A native of Kansas, Mr. Calder, who succeeds Mr. Groesbeck, joined the Bond and Share system in 1913 as financial officer of the Texas Power and Light Company and became successively vice-president and president of all Bond and Share interests in North Texas. He came to New York with American and Foreign Power as president in 1927.

A graduate of Harvard University, Mr. Walker joined Bond and Share in 1924, subsequently working with the Florida Power and Light Company, a subsidiary, in various capacities. He returned to New York in 1927 and by 1935 was made head of the general department of Ebasco Services, Inc., service organization of the system. He was elected vice-president and a director of Bond and Share in 1941.

Mr. Robertson, a graduate of McGill University, became associated with the Bond and Share system in 1916 and, after serving in various executive posts, was made, in 1929, operating sponsor for a number of subsidiaries of American and Foreign Power. He was elected vice-president of the company in 1942.

A native of New Jersey, Mr. Wiegers joined Bond and Share in 1925 as a member of its accounting department. He was elected assistant secretary-treasurer in 1935 and five years later became secretary-treasurer and a director of the company.

MARSHALL M. DRAKE has been appointed Assistant Director of Personnel of the Philadelphia Company and Subsidiary Companies, Pittsburgh, Pa., and for the Trustees, Pittsburgh Railways and Pittsburgh Motor Coach Companies.

A graduate of Penn-State College, Mr. Drake entered the service of the Pittsburgh Railways Company in 1926 as a Research Engineer, later becoming Superintendent of Operating Instruction and Employment Manager, Philadelphia Company and Subsidiary Companies, which position he held until his recent promotion.

In his new position he will be in charge of Employment Training, Veterans' Reemployment, Employee Information, Wage and Salary Stabilization, and Industrial Relations Research Activities. He is a Director of the Pittsburgh Personnel Association, and lives in Mount Lebanon.

DOUGLAS DOW, for the past four years on military leave from the Detroit Edison Co., serving in the United States Army with the rank of Lieutenant Colonel recently returned to the Detroit utility. His present assignment is in the sales department in charge of commercial research, which includes a study of factors affecting the use of electricity, industrial changes and commercial distribution.

His work on new applications of electricty in the domestic, commercial and industrial electrical fields involves an important assignment.

Three men, who joined the staff of Utah Power & Light Co. 31 years ago, were named to executive positions recently by the company's board of directors. GEORGE R. COREY was promoted to vice-president and secretary, RICHARD H. JONES was advanced to vice-president, and ROY H. ASHWORTH was promoted to commercial manager in charge of all division operations and commercial work.

Mr. Corey, who will continue as general counsel and a director for the company, started in the Utah Power engineering department in 1913. After graduating from the University of Utah law school in 1921, he was made assistant attorney and in 1929 was named as general counsel.

Mr. Jones started as a bookkeeper in 1913. Later promotions found him traveling auditor, office manager of the Salt Lake division and office manager of the construction department. He became treasurer in 1919 after serving two years in the Army air service. He will continue in the capacity of treasurer.

A graduate in electrical engineering from the University of Minnesota, Mr. Ashworth was first employed in 1913 in the company's statistical department. Successively he was assistant to the general superintendent, assistant to the president and general manager, assistant to the commercial manager, and finally he was made general superintendent in 1938.

LESLIE W. HOFFMAN has been named superintendent of the Beloit power plant and waterworks of the Wisconsin Power & Light Co., succeeding C. W. Florey, who retired last July after 37 years of service with the company.

B. C. RUSSELL, formerly assistant general superintendent of the Idaho Power Co., has been appointed general superintendent of that utility, to succeed the late R. B. King.

Mr. Russell has been engaged in power company work for 33 years. A graduate in electrical engineering from the University of North Dakota, he went west to work during the summer of 1911 for the Idaho-Oregon Light & Power Co. His first work was as a groundman with a line construction crew. He was then assigned to distribution and transmission construction, and the following year was transferred to power plant operating work, and later to power plant construction work.

During the reorganization period which resulted in the formation of the Idaho Power Co., Mr. Russell went to Boise in 1914 to work first for the receiver of the Idaho Railway, Light & Power Co. and later for the Electric Investment Co. With the organization of Idaho Power in 1916, he became an assistant to the superintendent of power. Mr. Russell was made assistant superintendent of power in 1919; superintendent of power in 1921, and assistant general superintendent in 1943.

HAROLD E. BAILEY, in charge of the new business department of the Greenfield office of the Western Massachusetts Electric Co., has been appointed Easthampton district superintendent of the company with headquarters in the latter place. Mr. Bailey joined the company in 1926 as a meter reader. He succeeds WARREN S. WHEELER, district super-

intendent for about 13 years, who has resigned to enter private business. CHARLES V. HAMEL has been appointed advertising manager of the western division of the company, with headquarters at Pittsfield, following connections in other lines of business.

F. R. GEORGE, engineer of electrical operation, Pacific Gas & Electric Co., San Francisco, Calif., has been appointed superintendent of the northern area of the company's territory. D. D. SMALLEY, formerly general superintendent of the San Joaquin Power division of the company, has been appointed superintendent of the central area.

JOE E. ELLIOTT, head of the industrial engineering department of the Southwestern Gas & Electric Co., Shreveport, La., has returned to his duties with that utility after more than two years of service with the armed forces.

PHIL B. STEWART, superintendent of the electric distribution department of the Cincinnati Gas & Electric Co. since 1936, has resigned to go into the appliance business in suburban Cincinnati. A veteran of 27 years of utility service, Mr. Stewart joined the company at the age of 16. Advancing consistently, he was appointed assistant superintendent of electric distribution under Francis R. Healey in 1927 and became department superintendent after the death of Mr. Healey in 1936.

KIMBALL I. JACK, has been appointed by the Washington Water Power Co. to head a newly organized personnel department and is responsible for employment, wage and salary control, training and education, safety and health, personal security and activities of employees. He will continue to supervise company advertising in addition to his new assignment. Mr. Jack went to Spokane in 1939 to form an advertising and promotion department for Washington Water Power Co. He was previously advertising manager for the Utah Power & Light Co., Salt Lake City. He is a national director of the Public Utilities Advertising Association.

A catalog of EEI publications is available upon request to
EDISON ELECTRIC INSTITUTE
420 Lexington Avenue, New York

CONVENTIONS AND MEETINGS

DECEMBER

6-8 National Association of Manufacturers, Waldorf-Astoria Hotel, New York, N. Y.

8 American Standards Association, Hotel Roosevelt, New York, N. Y.

JANUARY, 1945

17-18 Missouri Valley Electric Association, Power Sales Conference, Continental Hotel, Kansas City, Mo.

17-19 American Society of Civil Engineers, Hotel Commodore, New York, N. Y.

18-19 Canadian Electrical Association, Annual Winter Conference, Mount Royal Hotel, Montreal, Can.

22-26 American Institute of Electrical Engineers, Engineering Society Building, New York, N. Y.

30-31 Industrial Power and Heating Section, Commercial Division, EEI, Hotel Statler, Buffalo, N. Y.

FEBRUARY

8-9 Accident Prevention Committee, EEI, Hotel Cleveland, Cleveland, Ohio.

13-14 Electrical Equipment Committee, EEI, Netherland Plaza Hotel, Cincinnati, Ohio.

15-16 Transmission and Distribution Committee, EEI, William Penn Hotel, Pittsburgh, Pa.

MARCH

15-16 Canadian Electrical Association, Annual Western Conference, Hotel Vancouver, Vancouver, Can.

27-29 The Twelfth Annual Commercial Meetings, EEI, Edgewater Beach Hotel, Chicago, Ill.

APRIL

4-6 Missouri Valley Electric Association, Engineering Conference, Continental Hotel, Kansas City, Mo.

High Frequency Conference to Be Held at Chicago

A CONFERENCE on "Dielectric and Induction Heating" will be held Jan. 16-18, 1945, at Chicago under the auspices of the Great Lakes Power Club and Chicago Lighting Institute. All sessions will be held in the Marquette Auditorium, 2nd floor, 140 South Dearborn Street. There will be two sessions on each of three days, as follows:

Jan. 16—Afternoon: Induction Heating for Brazing, Low Temperature Soldering and Heat Treatment with High Frequency.
Jan. 16—Evening: Application of Dielectric Heating to Wood Products.
Jan. 17—Afternoon: Use of Dielectric Heating for Sterilization, Pasteurization, Cooking and Ensyme Control in Foods and Drugs.
Jan. 17—Evening: Forging, Melting and Heat Treatment of Large Masses of Metal.
Jan. 18—Afternoon: Uncommon Fields of Application for High Frequency.
Jan. 18—Evening: Use of Dielectric Heating for Plastics, Rubber and Rubber Substitutes.

Federal Projects Held Threat to Utilities

(*Continued from page* 393)

He believed some action on these lines necessary "if we are to reach the goal used by all postwar planners—an annual income from $120,000,000,000 to $160,000,000,000 and jobs for everyone who wishes to work."

Before the creation of the Rural Electrification Administration in 1935 and passage by Congress of the Rural Electrification Act in the next year, progress in this sphere had been slow. Sparse settlement of rural areas had made it almost impossible for electric companies to provide electric service at rates which farmers could afford to pay. The setting up of the rural electrification program by the Administration was based on the grounds that the use of Federal funds in this connection was justified by the benefits which would follow the rapid extension of electrification to farm areas.

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(Continued)

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